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SECRETARY OF THE AIR FORCE

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Flying Operations

AIR OPERATIONS RULES AND PROCEDURES

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This instruction implements AFPD 11-2, *Aircraft Rules and Procedures*, and provides rules and procedures for Air-to-Air and Air-to-Surface operations and training. It applies to aircrews, Air Battle Manager (ABM)/Weapons Director (WD), Joint Terminal Attack Controllers (JTACs), and Remotely Piloted Aircraft crews (RPA) tasked with or training for the Air and Space Power functions listed in AFDD1, Air Force Basic Doctrine. It applies to the following MAJCOMs: Air Combat Command (ACC), Air Education and Training Command (AETC), Air Force Special Operations Command (AFSOC), Air Mobility Command (AMC), Air National Guard (ANG), Air Force Reserve Command (AFRC), Pacific Air Forces (PACAF), and United States Air Forces in Europe (USAFE). This instruction does not apply to Undergraduate Pilot Training or Undergraduate Navigator Training. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF IMT 847, *Recommendation for Change of Publication*; route AF IMTs 847 from the field through MAJCOM publications/forms managers to HQ ACC/A3TW, 205 Dodd Blvd. Suite 101, Langley AFB VA 23665-2789. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN 37-123 (will convert to AFMAN 33-363), *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at **https://afrims.amc.af.mil/**.

SUMMARY OF CHANGES

This IC updates communications jamming (comm. jam) procedures (**paragraph 3.5.6.4.**), (**paragraph 3.5.6.5.**); flare procedures (**paragraph 3.6.2.1.**), (**paragraph 3.6.2.1.1.**), and (**paragraph 3.6.2.1.2.**); updates night lighting and illumination (**paragraph 3.8.2.2.**); updates live Air-to-Air missile carriage procedures (**paragraph 4.2.4.**) and (**paragraph 4.2.4.2.**); updates IMC intercept procedures (**paragraph 4.2.10.**), (**paragraph 4.2.10.2.**), (**paragraph 4.2.10.3.**), and (**paragraph 4.2.10.4.**); updates aircraft separation procedures (**paragraph 4.2.11.4.2.**), updates air defense procedures (**paragraph 4.9.2.3.**), (**paragraph 4.9.2.4.2.**), (**paragraph 4.9.2.5.**), (**paragraph 4.9.2.6.3.**), and (**paragraph 4.9.2.7.2.**); updates simulated attacks off-range and manned target restrictions (**paragraph 5.1.1.4.**) and (**paragraph 5.1.1.4.1.**); updates IAM and coordinate only mode employment procedures (**paragraph 5.1.1.6.**), (**paragraph 5.1.1.6.1.**), (**paragraph 5.1.1.6.2.**), (**paragraph 5.1.1.6.3.**), (**paragraph 5.1.1.6.4.**), (**paragraph 5.3.7.3.**), (**paragraph 5.9.1.1.**), and (**paragraph 5.9.2.3.**); updates terminology from bombing to weapons delivery (**paragraph 5.3.1.1.**) and (**paragraph 5.3.1.1.2.**); updates helicopter visibility requirements (**paragraph 5.5.1.**), (**paragraph 5.3.1.1.1.**) and (**paragraph 5.5.1.3.**); updates B-52 BDA Check (**paragraph 5.3.12.1.**), adds B-52 Stores Management Reference (**paragraph 5.3.12.2.**), updates B-52 BDA Check (**paragraph 5.6.3.**), updates JTAC/NATO FAC/Air Strike Control procedures (**paragraph 5.8.1.**); updates NATO FAC reference (**5.8.1.1.**), and (**paragraph 5.8.2.**); updates Joint Live Fire procedures (**paragraph A4.1.3.4.**), (**paragraph A4.1.3.4.3.**), (**paragraph A4.1.3.5.**), and (**paragraph A4.1.3.5.1.**); updates MSD Table **Attachment 6** and associated assumptions (**paragraph A6.1.1.**), (**paragraph A6.1.5.**), (**paragraph A6.2.1.1.**), (**paragraph A6.2.5.2.**), (**paragraph A6.2.6.**), (**paragraph A6.2.6.1.**), (**paragraph A6.2.5.2.**), and (**paragraph A6.3.**). This IC also makes administrative changes with the removal of F-117 references, replacement of WDZ for SAFE-RANGE, and updates terms, acronyms, and reference publications in **Attachment 1**. A bar (|) indicates a revision from the previous edition.

Chapter 1

INTRODUCTION

1.1. General Information:

1.1.1. **Purpose.** This instruction provides air operations rules and procedures for Air-to-Air and Air-to-Surface operations, and training for Air and Space Power functions listed in AFDD1, *Air Force Basic Doctrine*.

1.1.2. **Responsibilities Assigned.** Aircrew may perform operations or procedures not specifically addressed in this instruction only if they enhance safe, effective mission accomplishment. This instruction is not a substitute for sound judgment or common sense.

1.1.3. **MAJCOM Supplements.** MAJCOMs may change, or add procedures, as applicable, to this instruction, but must ensure changes are no less restrictive than the basic instruction. If supplemented, MAJCOMs must send one copy each to HQ AF/A3OT and HQ ACC/A3TW for coordination.

1.1.4. **Waivers.** Units will forward their request for a waiver to this instruction through their chain of command to their MAJCOM.

1.1.4.1. The waiver authority to this instruction is MAJCOM A3/XO or theater COMAFFOR.

1.1.4.2. MAJCOMs will forward copies of all approved waivers to HQ ACC/A3.

1.1.4.3. Exercise directors will brief all participants on waivers prior to conducting associated activities.

1.1.4.4. All waiver approvals will include an expiration date.

1.2. Scope. This instruction prescribes procedures for the execution of both operational and training missions.

1.3. Definitions. Attachment 1 provides terms, abbreviations, and acronyms used in this publication. Complete list of multi-service and AF brevity is not included in this document.

1.4. Improvement Recommendations. Use AF IMT 847, **Recommendation for Change of Publication (Flight Publications)**, to recommend changes to this instruction.

Chapter 2

GENERAL OPERATIONAL AND TRAINING PROCEDURES

2.1. General Information. This chapter provides general procedures applicable to Air-to-Air and Air-to-Surface scenarios for both operational and training missions.

2.2. Philosophy. Successful mission accomplishment demands effective coordination among all participants to include command authorities, controlling agencies, friendly surface-to-air sites, and airborne weapons systems. Operation Plans (OPLANs) and Operation Orders (OPORDs) will provide the foundation for this coordination.

2.2.1. Coordinate missions flown with other commands, services, and foreign nation services in advance. If guidance conflicts, apply the most restrictive guidance (TRs, operating instructions, etc.) of participating units.

2.3. General Aircrew, AWO/WD, and JTAC Responsibilities:

2.3.1. Use the procedures described in MDS-specific AFTTP 3-1s and 3-3s.

2.3.2. Know the capabilities and limitations of communications, control facilities, coordination requirements, and other weapons systems employed for mission accomplishment.

2.3.3. For all missions, be knowledgeable of the applicable OPLAN/OPORD, Special Instructions (SPINs), Air Operations Directive (AOD), Air Defense Plan, Airspace Control Plan, and review the daily Air Tasking Order (ATO), Airspace Control Order (ACO), and any other source available affecting the assigned area of responsibility (AOR).

2.3.4. Know the states of alert, readiness, warning, and Rules of Engagement (ROE) within the operational command's assigned AOR.

2.3.5. Know and comply with authentication procedures.

2.3.6. Know the characteristics and capabilities/limitations of the threat.

2.3.7. Know the tactics described in appropriate tactics manuals.

2.3.8. Know and comply with theater or region integrated air defense and airspace control procedures to include Minimum Risk Routes (Safe Passage) procedures, free fire zones, recovery airfield status, location of known friendly and enemy Surface-to-Air Missile (SAM) sites, etc.

2.3.9. Know and comply with local operating procedures and/or Training Rules (TRs).

2.3.10. As a minimum use **Attachment 2** as a guide to coordinate/brief prior to missions.

2.4. Initial Check-in and Recovery Procedures. Aircrews will check-in with the controlling agency, such as AWACS, CRC, or Forward Air Controller Airborne (FAC (A))/JTAC (Joint Terminal Attack Controller), as described below, unless restricted by the ATO. Some or all of the following calls may be omitted as required for Operations Security (OPSEC) or Communications Security (COMSEC).

2.4.1. Pass the following information at initial check-in:

2.4.1.1. Call sign.

2.4.1.2. Authenticate as required.

2.4.1.3. Deviations or aborts affecting mission accomplishment.

2.4.1.4. Mission or weapons system alibis that affect mission accomplishment.

2.4.2. The AWO/WD, FAC (A)/JTAC will accomplish the following:

2.4.2.1. Authenticate as required.

2.4.2.2. Indicate negative/positive radar contact (if applicable).

2.4.2.3. If equipped with Identification Friend or Foe/Selective Identification Feature (IFF/SIF), conduct an IFF/SIF check and advice aircrew of status “Sour” or “Sweet.”

2.4.2.4. Provide a brief to include location of friendly forces, civilians and no fire areas.

2.4.2.5. Pass information pertinent to mission accomplishment. Pass the air “Picture” and surface “Lowdown” to include Ground Order of Battle and Electronic Order of Battle. Do not pass information already in the ATO/ACO unless it requires special emphasis.

2.4.2.5.1. Status of Support Assets. At check-in, the mission commander will receive words on the status of all packages supporting the mission.

2.4.2.6. Provide working frequency or net and Time-of-Day (TOD) (if applicable).

2.4.2.7. Transfer control to the designated control agency (AWACS, CRC, etc.) and/or element/ controller, such as the AWO/WD, JTAC, FAC(A), etc (as applicable).

2.4.3. The controlling agency/aircrews will provide additional information, as required:

2.4.3.1. Available Air-to-Air armament. State Air-to-Air armament available by number of active, semi-active, and number of IR missile available. For example, use "2x2x2" for 2 AIM120, 2 AIM7, and 2 AIM9.

2.4.3.2. Available Air-to-Surface armament. The control agency, AWO/WD will pass any mission updates to include updated target coordinates.

2.4.3.3. Fuel Status. Pass fuel status by indicating the amount of playtime in minutes the flight has above "BINGO" fuel (e.g., "VIPER, PLAYTIME 50").

2.4.4. Recovery. The type of conflict and theater of operations will determine controlling agency priorities of recovering aircraft.

2.4.4.1. During recovery, aircrews will contact the controlling agency with the following:

2.4.4.1.1. Call sign and recovery base.

2.4.4.1.2. If available for additional Air-to-Air or Air-to-Surface mission, transmit “PLAYTIME” and ordnance remaining.

2.4.4.1.3. Mission results and intelligence.

2.4.4.2. The AWO/WD will, as conditions require:

2.4.4.2.1. Provide recovery instructions including base status and weather.

2.4.4.2.2. Copy and relay in-flight mission and/or weather reports.

2.4.4.2.3. Assist in Minimum Risk Route (Safe Passage) procedures.

2.5. Degrees of Control.

2.5.1. General Information:

2.5.1.1. OPORDs and OPLANS, command authority, ROE, commit criteria, and force commander's directions govern commit authority. The commit must be a joint effort between aircrews and the ABM/WD and may be initiated by either. When the aircrew initiates a commit, the flight lead will inform the ABM/WD and provide target information. When informed of a commit, the ABM/WD will check to ensure that the target is appropriate and assist as necessary. To terminate the commit, the ABM/WD will transmit "SKIP-IT" followed by appropriate directions. The "SKIP-IT" call is directive and aircrews will disengage unless the flight lead has Situational Awareness (SA) of targets or formations that threaten the flight. In this case, the flight lead will transmit "UNABLE" and continue the intercept. When the ABM/WD initiates a commit, the flight lead will acknowledge by directing the flight to commit or telling the ABM/WD "Negative Commit" and stating the reason.

2.5.1.2. The Continuum of Control is grouped into five levels: close, tactical, broadcast, advisory, and autonomous. SA is the determining factor of where the aircrew or AWO/WD might be along the continuum of control. Transition between levels of control may occur rapidly and continuously throughout the mission. The continuum allows maximum use of aircrews' and AWO/ WDs' SA while minimizing missed opportunities. **Table 2.1.** shows the Continuum of Control.

Table 2.1. The Continuum of Control.

<table>
<tr><td>Close control</td><td>Tactical control</td><td>Broadcast control</td><td>Advisory control</td><td>Autonomous Operations</td></tr>
<tr><td colspan="2">Target and commit information provided to specific flights</td><td>Target information provided but not to specific flights</td><td>Radar target information not available and not provided</td><td>Communication not available</td></tr>
<tr><td>Vectors and altitude</td><td colspan="4">Aircrew responsible for tactical positioning</td></tr>
</table>

2.5.2. Close Control. The AWO/WD is responsible for vectors, intercept geometry, and altitude deconfliction.

2.5.3. Tactical Control. Tactical control enables the maximum use of aircrew and AWO/WD radar and communication and SA to accomplish the mission. It is the standard employment level for the execution of operational and training missions and employs informative, comparative, and directive communications.

2.5.3.1. Aircrews will structure communications to support SA of all participants. Call sign usage is critical to mission success.

2.5.3.2. AWO/WDs will keep aircrews informed on all situations affecting their mission or execution through clear and concise communications. Bullseye, Bearing Range Altitude Aspect (BRAA), and other geographic reference systems may all be used during tactical control.

2.5.4. Broadcast Control. Broadcast control is a means for AWO/WDs to support air operations in a covert or saturated environment. AWO/WDs employ informative communications primarily to pass target information by referencing a designated location (such as bullseye), not a specific flight.

2.5.5. Advisory Control. Advisory control is a radio monitor mode used when the controlling agency loses radar capability.

2.5.6. Autonomous Operations. Autonomous operations occur when the aircrew cannot receive information or guidance from the controlling agency. During autonomous operations that are not pre-planned, both aircrew and the controlling agency will attempt to re-establish communications. AWO/WDs will not attempt contact during engagements or the vulnerability (vul) time.

2.6. Scenario Changes. Before the "FIGHT'S ON" call, exercise directors, mission commanders, and ABM/WDs will notify and receive acknowledgment from all aircrews for any scenario changes affecting safety of flight (e.g., airspace changes, weather in working area, block changes, altimeter setting, etc.).

2.7. Exercises. The following instructions apply to major exercises including, but not limited to Flag Exercises, Operational Readiness Inspections (ORI), and composite force training (CFT) exercises:

2.7.1. Special Instructions (SPINS). Exercise directors will publish and brief SPINS unique to their exercise.

2.7.2. Qualifications. Commanders will ensure that exercise participation is limited to those events that aircrews and AWO/WDs are qualified to perform. Mission Commander and other upgrades may be accomplished in a major exercise with appropriate supervision.

2.7.3. Briefing Requirements. Exercise directors will brief participants unfamiliar with this instruction to ensure they know and understand the TRs. For additional joint live fire briefing requirements, refer to **Attachment 4**. Exercise directors will also publish modifications to TRs in the exercise planning document to accommodate differences in TRs.

2.7.4. Pre-Mission Briefings (See **paragraph 4.2.1.** for additional Air-to-Air Training Rules briefing requirements.):

2.7.4.1. Pre-mission briefings will include the applicable portions of the TRs and exercise SPINS.

2.7.4.2. The mission commander, flight lead, a squadron or wing supervisor (flight commander or higher), weapons officer, or Inspector General (IG) representative will conduct daily telephonic mission briefs, e-mail, and/or Video Teleconference with participating units in exercises when operational constraints make it impractical for face-to-face briefings. This wing supervisor does not need to be flying in the mission, but must be a fully knowledgeable exercise participant.

2.7.5. Separation of Aircraft. Exercise directors and mission commanders will develop and implement deconfliction plans that provide adequate separation of participating aircraft. Use any combination of time, space (assigning specific geographical areas to flights), or altitude blocks to deconflict participating aircraft.

2.8. General Air-to-Air Refueling Rules.

2.8.1. AWO/WDs and aircrews will confirm altimeter, nose cold call, switches safe call, and monitor altitude separation for rendezvous except during EMCON Option 3 and 4.

2.9. Air-to-Air Refueling Tanker Abort. Tanker aircrew will inform receivers and the controlling agency if it experiences problems preventing it from completing the air-to-air refueling. The tanker aircraft commander will ensure aircraft separation and inform the receiver and AWO/WD of intentions.

2.10. Air-to-Air Refueling Communications:

2.10.1. Communications during Air-to-Air Refueling. Effective combat operations in a tactical environment require emission control (EMCON) procedures. Procedures need to be consistent with the command and control procedures, receiver and tanker proficiency, and flight safety. Minimized radio transmissions between command and control, the receivers, and the tankers require a pre-planned and coordinated off load, refueling order, ARCP, ARCT, and AAR exit point.

2.10.2. Emission Control Options:

2.10.2.1. EMCON Option 1. Reference ATP-56(B) Part 1 for detailed procedures. EMCON Option 1 will normally be used for qualification, requalification, category qualification and difference training for tanker or receiver units.

2.10.2.2. EMCON Option 2. Reference ATP-56(B) Part 1 for detailed procedures. EMCON Option 2 is the desired standard for daily air-to-air refueling operations and may be used for essential training provided tanker and receiver conduct verbal coordination prior to flight.

2.10.2.3. EMCON Option 3. Reference ATP-56(B) Part 1 for detailed procedures. EMCON Option 3 may be used for essential training provided tanker and receiver conduct verbal coordination prior to flight.

2.10.2.4. EMCON Option 4. Reference ATP-56(B) Part 1 for detailed procedures. EMCON Option 4 will not be practiced during peacetime operations unless specifically tasked by NAF or higher headquarters.

2.10.3. For Helicopter Air-to-air Refueling (HAR) emission control options, reference ATP-56(B) Part 3.

2.10.4. The following communication procedures apply if/when necessary during air-to-air refueling operations:

2.10.4.1. Aircrews will acknowledge all AWO/WD airspace and safety related calls.

2.10.4.2. AWO/WD procedures:

2.10.4.2.1. Direct air-to-air refueling missions consistent with the continuum of control.

2.10.4.2.2. Ensure altimeter settings are passed to all players.

2.10.4.2.3. Ensure receivers acknowledge "nose cold" and "switches safe" calls.

2.10.4.2.4. If required obtain and pass all post-refueling off-load information.

2.10.4.2.5. Acknowledge all aircrew safety related calls.

2.10.4.2.6. Advise the aircrews of the bearing, range, heading, and altitude (if available) of previously unreported aircraft within 10 miles that are potential conflict.

2.10.4.2.7. Advise aircrews when approaching airspace/refueling area boundaries (3 NM for fighters and 5 NM for heavies).

2.10.4.2.8. Provide all pertinent information (e.g., tanker/boom operator frequencies, threats, mission changes, airspace changes, weather, system degradation, etc.).

2.11. Air-to-Air Refueling Tactical Considerations:

2.11.1. All participants will be familiar with the type rendezvous, rendezvous point and time, tanker and receiver altitudes, missed rendezvous procedures, and back-up communications procedures.

2.11.2. The ATO will contain the EMCON Option(s) if other than EMCON Option 2.

2.11.3. Use communications as necessary during any emergency or unsafe situation.

2.11.4. For all standard refueling rendezvous the following roll-out criteria applies: For "speed-advantage" receivers, tanker aircraft will be positioned to achieve a 1-3 NM rollout in front of the receiver within a 60-degree cone (+/- 30 degrees of the receiver). For "speed-disadvantage" receivers, confirm with receivers desired rollout separation. (N/A for HAR).

Chapter 3

GENERAL TRAINING RULES

3.1. Introduction. This chapter provides general training rules and procedures for day, night, and low altitude operations.

3.2. G-Awareness Exercise. Conduct a G-awareness exercise IAW AFI 11-2MDS Vol 3, MAJCOM supplements, AFTTP 3-3, and/or established local procedures anytime:

3.2.1. For aircraft requiring a G-suit, anytime aircrews plan or are likely to maneuver above five Gs during the mission.

3.2.2. For aircraft not requiring a G-suit, anytime aircrews plan or are likely to maneuver above four Gs during the mission.

3.2.3. Maintain a minimum of 6000’ between aircraft (4000’ between T/AT-38), during the G-awareness exercises.

3.2.4. Conduct night G-awareness exercises in accordance with AFI 11-2MDS Vol 3, MAJCOM supplements, AFTTP 3-3, and/or established local procedures.

3.3. Single-Ship Operations. (N/A for AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance and helos). Units will fly single-ship training missions commensurate with expected wartime tasking. This does not restrict units from flying single-ship missions to meet training requirements (advanced handling, instruments sorties, red air, etc.). Units will specify fallout and single-ship operations in local operating instructions.

3.4. Knock-It-Off (KIO) and Terminate Procedures: Use KIO or Terminate procedures to direct aircraft to stop engagements, scenarios and tactical maneuvering.

3.4.1. KIO Procedures. A KIO call ceases all tactical maneuvering and the overall scenario. Use KIO procedures for the following:

3.4.1.1. If safety of flight is a factor.

3.4.1.1.1. A dangerous situation is developing.

3.4.1.1.2. An unbriefed or unscheduled flight enters the working area and is detrimental to the safe conduct of the mission.

3.4.1.1.3. Weather below minimums required to safely conduct the scenario.

3.4.1.1.4. Aircraft malfunctions affecting safety of flight.

3.4.1.1.5. Loss of Situational Awareness.

3.4.1.2. When Desired Learning Objectives (DLOs) are met or are unattainable for an entire scenario.

3.4.2. Once a "KNOCK-IT-OFF" is called, all participating aircraft will:

3.4.2.1. Acknowledge with call sign.

3.4.2.2. Cease tactical maneuvering and the scenario.

3.4.2.3. Deconflict flight paths and climb/descend to a safe altitude, blocks, or as briefed.

3.4.2.4. Address any problems/issues. Obtain verbal clearance from the flight lead/mission commander/exercise director/representative before resuming maneuvers.

3.4.3. Terminate procedures. A Terminate ceases all tactical maneuvering with the terminating aircraft or within a specific portion of a larger scenario.

3.4.3.1. Use Terminate procedures when safety of flight is not a factor in conjunction with the following:

3.4.3.1.1. Reaching BINGO fuel.

3.4.3.1.2. Desired learning objectives (DLOs) are met or are unattainable for a local engagement within a larger scenario.

3.4.3.1.3. Training rules or other limits met (e.g., 180-degree turn).

3.4.3.1.4. Exceeding area boundaries.

3.4.3.1.5. Below minimum altitude or within minimum range which does not compromise safety.

3.4.3.1.6. Below 5,000' AGL and airspeed below MDS minimum, within visual range (Defined as <5NM) of adversary.

3.4.3.2. Initiate terminates procedures with a wing rock or transmit "TERMINATE" when conditions are not appropriate for a wing rock (night/weather, ownship parameters will not allow, etc.) and when terminating an engagement within a larger scenario. When calling "TERMINATE" anchor position geographically or with a bullseye reference ("(Callsign), terminate south fight" or "(Callsign), terminate fight, BULLSEYE 180/10)". Use amplifying information if necessary (altitude, type aircraft, and geographical feature).

3.4.3.3. If "Terminate" is called within a large scenario, radio acknowledgments (in roll call fashion) are not required, however all affected element leads must ensure compliance. All participating aircraft within visual range (defined as <5NM) of a terminated fight, whether passed via a radio call or wing rock will:

3.4.3.3.1. Cease tactical maneuvering with the terminating aircraft, group of aircraft, or as specified in the terminate call.

3.4.3.3.2. Deconflict flight paths and climb/descend to a safe altitude, blocks, or as briefed.

3.5. Communications Jamming (Comm Jam) Procedures:

3.5.1. Exercise directors will brief procedures to all personnel directly associated with comm jam missions (aircrews, AWOs/WDs, jammers, JTAC) to include jam free and safety frequencies, and lost comm procedures. Accomplish comm jam only in tactical training areas.

3.5.2. Preface all transmissions required for safety (e.g., weather changes, airspace advisories, etc.) with "SAFETY, SAFETY." Upon hearing this call all jammers on the frequency(s) will cease jamming to allow the transmission.

3.5.3. Transmit "KNOCK-IT-OFF" to terminate both comm jamming and maneuvering.

3.5.4. Any person employing communications spoofing will not use terms with safety implications, e.g., "KNOCK-IT-OFF," "CHATTER-MARK," or "SAFETY" as comm jamming tactics.

3.5.5. Do not conduct jamming on Guard or any predesignated safety frequency.

3.5.6. In training, do not conduct jamming that would affect the following activities:

3.5.6.1. Air-to-air refueling.

3.5.6.2. Actual personnel or cargo air drops.

3.5.6.3. Aircraft in distress.

3.5.6.4. Aircraft in IMC conditions.

3.5.6.5. Live ordnance delivery missions.

3.6. Chaff, Flare, and Smokey Devil Procedures:

3.6.1. Arm chaff, flare, and Smokey Devil systems only in an approved airspace.

3.6.2. Smokey Devil or Flare Employment:

3.6.2.1. Aircrews may employ flares or originally manufactured Smokey Devils when operating over government owned or controlled property (including over water warning areas). Aircrews will make every attempt to verify current fire conditions prior to employment. If unable to verify current fire conditions, aircrew will adhere to the most restrictive fire hazard procedures until a less restrictive update is received. Use the following minimum altitudes:

3.6.2.1.1. No fire hazard: Aircrew may employ down to their minimum altitude unless a higher altitude is specified in range regulations.

3.6.2.1.2. Fire hazard: According to applicable AFI 11-2MDS series directives or range regulations, whichever is most restrictive. Smokey Devils limited to 500 AGL.

3.6.2.2. In training areas over other than government-owned or controlled property, minimum flare employment altitude is 2,000 feet AGL unless specified otherwise in governing regulations. Outside the U.S. refer to host nation rules governing the employment of flares.

3.6.2.2.1. Value Engineering Change Proposal Smokey Devils (VECP SD) minimum altitude for employment is 300 feet. Aircrews may employ flares and VECP SD in a non-government owned or controlled training areas (i.e., Military Operations Areas (MOA), Military Training Routes (e.g., IR, VR)) only if the training area has an approved AF Form 813, *Request For Environmental Impact Analysi*s. Aircrews need to contact local airspace manager for information.

3.6.3. When employing chaff in the U.S. and Canada, refer to CJCSM 3212.02B, *Performing Electronic Attack In the U.S. and Canada For Tests, Training, and Exercises*, and/or in accordance with published range orders. Outside the U.S. and Canada, refer to host nation rules governing the employment of chaff.

3.7. Low Altitude Training Rules:

3.7.1. Maneuvering transition to low altitude (N/A for helicopters). Maximum dive angle during maneuvering flight below 5,000 feet AGL is the lesser of 45 degrees or one percent of your AGL altitude (e.g., 40 degrees nose low at 4,000 feet AGL, 30 degrees nose low at 3,000 feet AGL, etc.). Reduce dives starting above 5,000 feet AGL to 45 degrees or less before passing 5,000 feet AGL.

3.7.2. Adhere to low altitude guidance IAW the applicable 11-2MDS Vol 3.

3.8. Night Training Rules. This section adds additional night TRs applicable to both Air-to-Air and Air-to-Surface night training. For AFSOC assigned/gained aircraft and aircraft operated under AFSOC lead command guidance, comply with AFI 11-2MDS and MAJCOM guidance. For AMC assigned/ gained aircraft and aircraft operated under AMC lead command guidance, see basic MDS or AMC publications.

3.8.1. Day, Night, and Civil Twilight Procedures. Use day rules and procedures (operational and training) during civil twilight (defined in the air almanac or flight weather briefing). Use night or weather procedures when adverse conditions exist during civil twilight.

3.8.2. Night Lighting and Illumination:

3.8.2.1. Aircraft Lighting Category Definitions. (Note: These definitions do not relieve aircrews from complying with FAA aircraft lighting restrictions).

3.8.2.1.1. Full-up: Normal aircraft lighting IAW AFI 11-202, Vol 3 and waivers.

3.8.2.1.2. Reduced: Anti-collision and strobe lights off, position lights on.

3.8.2.1.3. Covert: Night lighting visible through NVGs but not visible to the naked eye.

3.8.2.1.4. Lights-out: All external lights off.

3.8.2.2. Adhere to MAJCOM guidance and/or MDS series Operations Procedures Volume 3, chapter 8 guidance for training with Reduced/Covert/Lights-out settings.

3.8.2.3. Illumination Levels:

3.8.2.3.1. High Illumination (HI) is defined as illumination, derived from natural or artificial sources, of 2.2 millilux illumination or greater, unless defined otherwise in AFI 11-2MDS series instructions.

3.8.2.3.2. Low Illumination (LI) is defined as less than 2.2. millilux, unless defined otherwise in aircraft specific AFI 11-2MDS series instructions.

3.8.2.3.3. In aircraft not equipped with in-flight illumination measuring devices, the flight lead or individual pilot is the final determining authority to assess actual illumination for a particular mission element, based on visibility and terrain features/resolution.

3.8.2.3.3.1. Missions planned for HI may transition to LI TRs in-flight depending upon weather, moon rise/set, artificial illumination, etc. Missions may not transition from a LI mission to HI TRs unless the actual conditions

permit, and the HI mission was both planned for and briefed. AFSOC assigned/gained aircraft and aircraft operated under AFSOC lead command guidance, comply with AFI 11-2MDS and MAJCOM guidance. AMC assigned/gained aircraft and aircraft operated under AMC lead command guidance, comply with AFI 11-2MDS and MAJCOM guidance.

3.8.3. Minimum Altitude. The minimum altitude at night is Minimum Safe Altitude (MSA), Terrain. Following/Terrain Avoidance (TF/TA) or NVG minimum altitude as appropriate. Special Operations/ airlift / rescue aircraft may operate below the MSA according to AFI 11-2MDS series instructions. AMC assigned/gained aircraft and aircraft operated under AMC lead command guidance, comply with AFI 11-2MDS and MAJCOM guidance.

3.8.3.1. NVG minimum altitude (N/A for AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance).

3.8.3.1.1. With HI, the minimum altitude for NVG (non TF/TA) operations is 1,000 ft AGL.

3.8.3.1.2. With LI, the minimum altitude for NVG operations is the MSA.

3.8.3.2. Aircraft conducting TFR/TA operations with NVGs may use the lower of the two minimum altitudes.

3.8.4. NVG Mission Planning and Operational Considerations.

3.8.4.1. Mission Planning.

3.8.4.1.1. NVG pre-mission planning will be accomplished using a DoD-approved light level-planning program.

3.8.4.1.2. If ambient illumination is low and artificial illumination is planned to enhance the mission, a "no flares/artificial illumination" back-up option will be briefed.

3.8.4.1.3. All flights will plan LI and no-NVG back-up options (N/A for AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance and helicopters).

3.8.4.2. Operational Considerations.

3.8.4.2.1. When only a portion of participating aircraft is NVG-equipped, inter-flight deconfliction will be accomplished using visible lighting or positive altitude/area deconfliction. All aircraft will halt any reduced, covert, or lights-out operations when a "KNOCK-IT-OFF" occurs until positive separation of aircraft is ensured.

3.8.4.2.2. Failure of any portion of the NVGs requires an immediate transfer to instruments and establishment of non-NVG procedures. Resume NVG operations only after correcting the NVG malfunction. AFSOC assigned/gained aircraft and aircraft operated under AFSOC lead command guidance, comply with AFI 11-2MDS and MAJCOM guidance. AMC assigned/ gained aircraft and aircraft operated under AMC lead command guidance, comply with AFI11-2MDS and MAJCOM guidance.

Chapter 4

AIR-TO-AIR TRAINING RULES

4.1. Introduction. This chapter provides rules that apply to all categories of Air-to-Air training.

4.2. General Air-to-Air Training Rules:

4.2.1. Briefing and Debriefing Requirements:

4.2.1.1. Accomplish face-to-face briefings for normal day-to-day training. Conduct telephonic or electronic briefings when circumstances prevent face-to-face briefings or debriefings. Conduct airborne briefings when circumstances prevent face-to-face or telephone briefings.

4.2.1.2. As a minimum, face-to-face, telephonic and electronic briefings will cover the items in the General Coordination briefing guide in **Attachment 2**. For electronic briefings, confirm that the briefing is received and understood by the recipient.

4.2.1.3. Flight debriefings will critically assess mission execution and offer solutions to problems encountered.

4.2.2. Airspace: Conduct training within designated airspace. Both aircrews and AWO/WDs share joint responsibility in avoiding lateral spill-outs. It is the aircrews' responsibility to avoid vertical spill-outs. Accomplish supersonic flight only in designated areas.

4.2.3. Communications. Basic procedures are in **Chapter 2** and **Chapter 3**. The following additional procedures apply to Air-to-Air training:

4.2.3.1. Aircrews will acknowledge all AWO/WD airspace and safety related calls.

4.2.3.2. AWO/WD procedures:

4.2.3.2.1. Advise aircrews of the bearing, range, heading, and altitude (if available) of previously unreported aircraft within 10 miles that are a potential hazard.

4.2.3.2.2. Advise aircrews when the controlling agency cannot support a minimum of broadcast control. In this situation, only continue an engagement if the aircrew can provide safe separation.

4.2.3.2.3. Advise aircrews when they approach airspace boundaries (3 nm for fighters and 5 NM for heavies) or as directed by the Air Traffic Control (ATC) agency.

4.2.3.2.4. Provide other pertinent information (e.g., airspace changes, weather in working area, system degradation, etc.).

4.2.3.3. If using separate frequencies for opposing forces, AWOs/WDs and/or RTOs must have simultaneous monitor and broadcast capability on each working frequency. AWOs/WDs and/or RTOs will immediately pass all KNOCK-IT-OFFs, TERMINATEs and safety of flight information to all participating aircraft.

4.2.4. Live Air-to-Air Missile Carriage:

4.2.4.1. Do not fly with live Air-to-Air missiles in peacetime, except under the following circumstances:

4.2.4.1.1. Air defense alert aircraft, to include changeover sorties.

4.2.4.1.2. Weapon System Evaluation Program (WSEP), and Operational Test and Evaluation(OT&E) programs (reference **Attachment 5**).

4.2.4.1.3. Aircraft flown following generation exercises.

4.2.4.1.4. As authorized by MAJCOM/A3 (or equivalent), service directives, or OPLAN tasking.

4.2.4.2. The following requirements apply to authorized carriage of live Air-to-Air missiles for other than WSEP firings:

4.2.4.2.1. Aircrews will make a "WEAPONS SAFE" call upon initial check-in and before each setup following a KIO or terminate. Check the master arm switch in the SAFE, SIM, OFF, or equivalent position, and use the weapons panel or Heads Up Display (HUD) to verify the Weapons Safe position.

4.2.4.2.2. Do not simulate weapons employment, squeeze trigger or depress the pickle button.

4.2.4.2.3. Maximum maneuvering category is LIMITED.

4.2.4.2.4. Do not use the terms “HOSTILE” or “KILL” at anytime.

4.2.5. Simulated Gun/Missile/Laser Employment:

4.2.5.1. To prevent inadvertent firings when simulating gun employment ensure the following:

4.2.5.1.1. Have no ammunition loaded or safe the gun according to –34 Series T.O.s, or comply with AFI 11-2MDS Volume 3 guidance.

4.2.5.1.2. Perform a trigger check (trigger squeeze) before simulated gun employment.

4.2.5.2. Only A-10 aircraft may simulate gun employment with a gun that is not safe per **paragraph 4.2.5.1.1.** Adhere to procedures outlined in 11-2A-OA10 Vol 3, *A/OA-10 Operations Procedures*.

4.2.5.3. To train or simulate missile employment with a gun that is not safe IAW –34 Series T.O.s, accomplish all of the following:

4.2.5.3.1. Load no live missiles.

4.2.5.3.2. Place the master arm switch in the SAFE, SIM, OFF, or equivalent position.

4.2.5.3.3. Verify the weapons panel or HUD display SAFE, SIM, OFF, or equivalent position.

4.2.5.3.4. Do not squeeze the gun trigger.

4.2.5.4. Air-to-Air Laser Employment:

4.2.5.4.1. Eye Safe Laser Setting. Laser-equipped aircraft may use an eye safe laser setting (1.54 microns) at any time. Aircrew Laser Eye Protection (ALEP) is not required.

4.2.5.4.2. Combat Laser Setting for Air-to-Air Employment. Laser-equipped aircraft are prohibited from using a combat laser setting (1.06 microns) during peacetime training missions unless OG/CC specifically approves use for a training exercise, test, or WSEP. Unit will contact and abide by current guidelines established by Armstrong Lab (AL/OEO), Brooks AFB, TX. (For Air-to-Ground Laser Employment see **5.1.1.5.**)

4.2.6. Fuel Requirements:

4.2.6.1. Establish fuel minimums for each mission.

4.2.6.2. Perform ops checks prior to each engagement and/or periodically during the vul period.

4.2.7. Maneuvering Categories. This section provides maneuvering categories for aircraft during Air-to-Air training missions. This section also specifies the maximum maneuvering allowed during Air-to-Air training based on flight conditions (day, night, or weather) or altitude. The rules of this instruction, MAJCOM or service directives, or aircraft limitations apply, whichever is the more restrictive.

4.2.7.1. The engagement begins when opposing aircraft initiate visual maneuvers against each other. The altitude of the lowest participating aircraft determines the maneuvering category. When in doubt, default to the more restrictive category.

4.2.7.2. **UNLIMITED.** Provides for Air-to-Air training with no limitations on maneuvering other than AFI 11-2MDS and flight manual aircraft limitations.

4.2.7.2.1. Weather Requirements: 2,000 feet vertical and 1 NM horizontal cloud clearance, 5 NM visibility and discernible horizon.

4.2.7.2.2. Minimum altitude is 5,000 feet AGL.

4.2.7.3. **LIMITED.** Provides for Air-to-Air training with the following limitations.

4.2.7.3.1. Weather Requirements: VFR Cloud Clearances.

4.2.7.3.2. Offensive/Neutral aircraft have no maneuver restrictions pre-merge.

4.2.7.3.3. An engagement can continue until:

4.2.7.3.3.1. A Terminate or Knock it off occurs.

4.2.7.3.3.2. A role reversal between two opposing aircraft.

4.2.7.3.3.3. A defender reaches 180 degree of turn. (A defender is an aircraft visually reacting to defeat an adversary's attack aft of 3/9. All maneuvers into and out of the notch are excluded.) (N/A for AFSOC, units under AFSOC oversight, or AFSOC gained).

4.2.7.3.3.4. If neither aircraft can be clearly identified as the defender, the engagement will be terminated after the first aircraft reaches 180 degrees of turn

after 3/9 passage.

4.2.7.4. **RESTRICTED.** Provides for Air-to-Air training with heading changes of up to 60 degrees either side of course. This does not apply to aircraft performing conversions versus RESTRICTED maneuvering targets.

4.2.7.5. **NON-MANEUVERING.** Provides for Air-to-Air training by maintaining constant heading, airspeed, and altitude. This does not apply to aircraft performing conversions versus NON-MANEUVERING targets.

4.2.7.6. **CONTROLLED.** Provides for Air-to-Air 1 v 1 night visual training conducted with NVGs. Maneuvers are fluid and continue beyond 180 degrees, but maneuvering options of the defensive fighter are predetermined and restricted to a maximum of 540 degrees. Controlled maneuvering may only be conducted as authorized in applicable volumes of AFI 11-2MDS series guidance. Abide by the following restrictions:

4.2.7.6.1. Weather Requirements: 2,000 feet vertical and 1 nm horizontal cloud clearance, 5 NM visibility, discernible horizon, and HI.

4.2.7.6.2. Minimum altitude is 5000 feet AGL.

4.2.8. **LOWAT.** (Low Altitude) Maneuvering Below 5000 feet AGL (fixed wing).

4.2.8.1. LIMITED is the maximum maneuvering category.

4.2.8.2. Weather requirements: 2,000 feet vertical and 1 NM horizontal cloud clearance, 5 NM visibility, and discernible horizon.

4.2.8.3. Do not perform rolling or exaggerated vertical maneuvering.

4.2.8.4. Defender's reactions must be level to climbing. (Exception: AFSOC, units under AFSOC oversight, or AFSOC gained fixed wing aircraft may execute descending defensive reactions).

4.2.8.5. Minimum altitude for aircraft engaged in offensive and defensive Air-to-Air maneuvering is 300 ft AGL (250 ft for AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance), pilot minimums, or as directed by MDS-specific instructions, whichever is higher.

4.2.8.6. Minimum altitude for aircraft engaged in offensive and defensive Air-to-Air maneuvering overwater is 1000 feet AGL. (N/A for AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance).

4.2.8.7. Minimum altitude for aircraft not engaged in offensive or defensive maneuvering at low altitude is 100 ft AGL, pilot minimums, or as directed by MDS-specific instructions, whichever is higher.

4.2.8.8. Upon completion of a defensive reaction at low altitude, do not perform additional reactions to follow-on attacks beyond visual range (defined as >5NM) until reestablishing the pre-briefed minimum MDS-specific tactical airspeed.

4.2.8.9. Determine minimum altitudes by MAJCOM directives, service directives, personal low altitude minimums, whichever is higher.

4.2.9. **Night:**

4.2.9.1. LIMITED is the maximum maneuvering category unless flying CONTROLLED maneuvering exercises.

4.2.9.2. Include frequent flight instrument cross-checks during all engagements.

4.2.9.3. No visual-only intercepts for non-NVG equipped aircrew.

4.2.9.4. For NVG-equipped aircrew, visual-only intercepts are authorized if a discernable horizon exists, target line-of-sight (LOS) rate is observed, and range/altitude to complete the intercept is perceived. If no target LOS rate is observed, or range/altitude to complete the intercept is not perceived using NVGs, another instrument or sensor must be used to complete the intercept. If a discernable horizon is lost during the intercept, revert to non-NVG night operations and ensure safe separation of aircraft. If unable, discontinue the intercept.

4.2.10. Instrument Meteorological Conditions (IMC). Conduct IMC intercepts in approved special use airspace under the control of or monitored by GCI/AWACS. Without GCI/AWACS control, IMC intercepts are approved in restricted areas, warning areas above 18,000' MSL, or in Air Traffic Control Assigned Airspace (ATCAA) unless prohibited by published range operating procedures or additional MDS-specific requirements.

4.2.10.1. IMC rules will apply when LIMITED maneuvering weather criteria cannot be maintained. (EXCEPTION: AFSOC, units under AFSOC oversight, or AFSOC gained aircraft conducting IMC intercept training above 3000’ AGL may maneuver up to the limitations specified for the LIMITED maneuvering category. When conducting IMC intercept training below 3000’ AGL, AFSOC, units under AFSOC oversight, or AFSOC gained aircraft are limited to the RESTRICTED maneuvering category.)

4.2.10.2. Flight Leads will designate training aid(s) and altitude blocks. When all aircraft are outside of 10 NM (15 NM with F-22), training aids (i.e., adversary aircraft) may maneuver within the following parameters (60 degrees of bank, +/- 15 degrees of pitch), in order to set the desired picture and to accomplished pre-briefed and scripted threat reactions only. Outside 10 NM (15 NM with F-22), the intercept aircraft (i.e., blue air) may maneuver within the following parameters (60 degrees of bank, +/- 15 degrees of pitch), in order to execute their tactics and perform benign threat reactions (i.e. OUTs and ABORTs). If the bank/pitch limits are inadvertently exceeded, pilots will terminate tactical maneuvering in their aircraft and recover to within the prescribed limits. Once back within limits, tactical maneuvering may resume. All altitude changes in IMC, regardless of role, will be coordinated to ensure aircraft separation requirements (i.e., "Blue 1's out left, descending to 25,000"). NLT 10 NM (15 NM with F-22), adversary aircraft will be NON-MANEUVERING, blue air will be RESTRICTED maneuvering and all aircraft will maintain the pre-briefed altitude blocks.

4.2.10.3. NLT 10 NM (15 NM with F-22), GCI/AWACS (or the RTO as long as all players are tracking), will make a "10 NM (15 NM with F-22), check blocks" call. If GCI/AWACS is unavailable, or if the RTO does not have all players tracking, all aircraft will maintain their altitude blocks at all times, adversaries will be NON-MANEUVERING and blue air will be RESTRICTED maneuvering for the duration of the intercept.

4.2.10.4. Maintain constant flight instrument cross-checks during all phases of flight.

4.2.11. Separation of Aircraft: Each participant must use "see and avoid" techniques to ensure a clear flight path, especially while entering and exiting engagements. Aircrew must assume that adversaries do not see their aircraft and may maneuver in an unpredictable manner. If loss of visual or tally occurs, establish positive separation until regaining visual contact. Flight leads will ensure deconfliction for concurrent missions in the same airspace.

4.2.11.1. Attackers losing sight will maneuver away from the defender's last known position.

4.2.11.1.1. Make a No Joy call if in radio contact with target aircraft.

4.2.11.2. Defenders losing sight and SA will maneuver predictably.

4.2.11.2.1. Make a No Joy call if in radio contact with the attacking aircraft.

4.2.11.3. If the attacker cannot ensure separation from trailers within a lead-trail formation, do not perform rear quarter attacks against the leaders.

4.2.11.4. Minimum Separation: The minimum slant range between aircraft during CMR/BMC/ MQT Air-to-Air maneuvering is the greater of: a) 500 feet, b) 1,000 feet for night, weather, bomber, tanker, airlift, AFSOC/Rescue fixed-wing, and FTU/FMS student Basic and Qualification training or as directed by syllabus, c) 1,500 feet during CONTROLLED maneuvering exercises. Aircrews will not penetrate a 1000 ft vertically or 1500 ft horizontally of the JSTARS and AWACS. (Exceptions to minimum slant ranges are outlined in **paragraph 4.9.** for Low/Slow VID and **paragraph 4.7.** for helicopter versus helicopter training).

4.2.11.4.1. F-22 and adversary air will utilize a 1,000' Training Rule Bubble around all fighters flying DACT with the F-22 day or night. F-22 pilots will use a 1,000' bubble when flying similar ACT.

4.2.11.4.2. (PACAF) Minimum slant range between fixed wing aircraft and any other aircraft during Air-to-Air maneuvering below 5000’ AGL is 1500’.

4.2.11.5. Altitude Blocks: Assign hard altitudes or altitude blocks to provide vertical separation for non-visual setups. Aircrew cannot rely on altitude blocks to guarantee separation once any participant initiates visual maneuvering.

4.2.11.5.1. A minimum of 1,000 feet vertical separation between altitude blocks is required at or above 5,000 feet AGL.

4.2.11.5.2. A minimum of 500 feet vertical separation between altitude blocks is required below 5,000 feet AGL. (100 feet between A-10s and helicopters during anti-helicopter training).

4.2.11.5.3. Ensure deconfliction with friendly forces within 10 NM. Where visual deconfliction is not possible, utilize a minimum of 1,000 feet (500 feet if below 5,000 AGL) altitude separation or deconflict by geography, timing, onboard systems, or GCI/AWACS.

4.2.11.5.3.1. F-22s and their adversaries will use a 15 NM range for block adherence and separation of aircraft in lieu of the 10 NM guidance. Aircraft may

leave their blocks inside of 15 NM IAW AFI 11-214 block adherence procedures. If AWACS/GCI is unavailable, all players must be on a common frequency and a "15 miles check blocks" call will be made by the closest Raptor to the adversary aircraft.

4.2.11.6. Transition Blocks:

4.2.11.6.1. Aircraft may not transit or enter the altitude or altitude block of any adversary unless at least one of the following conditions apply: (For helicopter versus helicopter see **paragraph 4.7.**)

4.2.11.6.1.1. All adversaries are beyond 10 NM (15 NM for F-22).

4.2.11.6.1.2. Tally is established on all aircraft in the group of interest and no conflict with other groups within 10 NM exists.

4.2.11.6.1.3. Not Tally with all adversaries within 10 NM but not a conflict (i.e., no collision potential) based on situational awareness (SA).

4.2.11.6.1.4. Verbally confirm adversary's hard altitude and maintain required vertical separation.

4.2.11.7. When two aircraft approach head-on, each will clear to the right unless maneuvering to do so would result in crossing flight paths. Aircraft with the higher nose position will attempt to go above the opponent if energy state permits.

4.2.11.8. Attackers will cease weapons employment under the following conditions:

4.2.11.8.1. Pure pursuit, head-on missile attacks prior to 9,000 feet slant range (3,000 feet for helicopter versus helicopter). Maneuver aggressively to deconflict flight paths so as not to violate minimum range.

4.2.11.8.2. Any gun attack exceeding 135 degrees aspect (except fighter vs. helicopter engagements where all participants remain in their blocks).

4.2.11.8.3. Target aircraft begins an Air-to-Surface delivery maneuver below 5000 feet AGL or employing live ordnance.

4.2.11.8.4. Target aircraft conducting helicopter air-to-air refueling.

4.2.12. Single-Ship Operations (n/a for AFSOC, units under AFSOC oversight, or AFSOC gained / HELO) Combat Mission Ready (CMR) or Basic Mission Capable (BMC) Air-to-Air qualified pilots may fly single-ship Air-to-Air training missions in accordance with **paragraph 3.3.** Initial Qualification Training (IQT)/Mission Qualification Training (MQT) aircrew require an instructor or squadron supervisor on board the aircraft.

4.2.13. Visual Engagements. Flight leads will strictly enforce briefed training DLOs in all visual engagements, and will terminate maneuvering so as to prevent degradation in flight safety or mission/ scenario conduct.

4.2.13.1. No more than eight aircraft may participate in the same visual engagement.

4.2.13.2. **(Multi-role aircraft)** Maximum of four similar aircraft in an unlimited maneuvering visual engagement.

4.2.13.2.1. A visual engagement is defined as merges occurring within 5 NM of each other.

4.2.13.2.2. The USAF Weapons School, Red Flag, Maple Flag, Cope Thunder and composite forces with F-15Cs in an OCA role are exempt.

4.2.13.2.3. Approval authority for other exemptions is MAJCOM/A3.

4.2.14. Flight Composition. Unlike fighters with an integrated mission may employ in mixed elements.

4.2.14.1. 1 v 1 v 1 BFM training scenarios are not conducive to overall training objectives of BFM training and shall not be conducted. 1 v 1 v 1 BFM is defined as visual setups in which 3 or more separate roles/sides are engaged in visual maneuvering at one time.

4.3. Bomber Aircraft Training Rules. This section applies to all echelons of participating commands and to all agencies under the operational control of HQ ACC and those units under ACC oversight. In addition, these procedures apply to other services and foreign services with joint training agreements. The information and TRs in this chapter apply with the following exceptions and additions:

4.3.1. Special Procedures: Only conduct Air-to-Air training with armed aircraft (bomber or fighter) under the following guidelines:

4.3.1.1. The participants' group commanders approve the training.

4.3.2. Training Rules:

4.3.2.1. Fighter aircrews will be CMR, BMC or MQT. MQT fighter aircrews will only participate in bomber Air-to-Air training with a supervisor or instructor in the aircraft.

4.3.2.2. The maneuvering category for bomber aircraft during all fighter activity will be LIMITED, except when restricted by **paragraph 4.2.7.** During operations below 500 feet AGL bomber maximum bank angle is 30 degrees.

4.3.3. Electronic Attack (EA) Activity During Air Defense Exercises. Provides joint aircrew and AWO/WD training in a simulated threat environment. The training involves Air Defense Sectors (ADS) and or AWACS directing intercept aircraft against bomber aircraft that are employing EA techniques to defeat the intercept. The exercise includes both EA and Air-to-Air training, and may be conducted in conjunction with each other or individually within a designated Training Area (TA). All EA activity will be conducted IAW CJCSM 3212.02, ACCI 10-707, applicable range guides, exercise SPINS, and this instruction.

4.3.3.1. With Air Defense Sectors (ADS) coordination and approval, the bomber may employ maximum EA and chaff against air and ground based radars, communications, or AWACS covering a designated TA.

4.3.3.2. The radar facilities may employ any or all EP techniques, fixes, and equipment to counter bomber EA activity.

4.3.3.3. Bomber aircrew will contact the ROCC/SOCC/AWACS controlling the TA, at least 15 minutes before the IP. See **Attachment 2** for coordination information.

4.3.3.4. After positive identification and handover from ATC, the AWO/WD will vector bomber aircraft within the assigned airspace for the duration of the training period. To maximize use of all training aircraft, use IFF/SIF positive target control (PTC) programs to provide discrete tracking and improved safety control of adversary aircraft in an EA environment. Primary responsibility for safety rests with the controlling agency.

4.4. Airlift Aircraft Training Rules. This section applies to all echelons of participating commands and to all agencies under the operational control of MAJCOMs with airlift aircraft. In addition, these procedures apply to joint training agreements with other services and foreign services. The provisions of this chapter apply with the following exceptions and additions:

4.4.1. Training Rules:

4.4.1.1. Weather Criteria and Maneuvering Limits:

4.4.1.1.1. Limit standard airlift formation flights to day/Visual Meteorological Conditions (VMC) conditions. The maximum maneuvering category is LIMITED. Maximum bank angle is 60 degrees.

4.4.1.1.2. Night. The maximum maneuvering category is RESTRICTED. Maximum bank angle is 45 degrees and no altitude change. Do not conduct night Air-to-Air training against airlift formation flights.

4.4.1.1.3. IMC. Conduct Air-to-Air training in IMC only with RWR equipped airlift aircraft. All aircraft must maintain continuous communications. Limit evasive maneuvering to RESTRICTED maneuvers with a maximum of 45 degrees of bank and no altitude change. The minimum range for simulated ordnance delivery is 1 NM.

4.4.1.2. Fighter aircrews will be CMR or BMC before conducting Air-to-Air training with airlift aircraft.

4.5. Tanker Aircraft Training Rules. This section applies to all echelons of participating commands and to all agencies under the operational control of MAJCOMs with tanker aircraft. In addition, these procedures apply to joint training agreements with other services and foreign services. AFSOC assigned/ gained aircraft and tanker aircraft operating under AFSOC lead command guidance will adhere to the procedures in **paragraph 4.6.** The provisions of this chapter apply with the following exceptions and additions.

4.5.1. General:

4.5.1.1. Accomplish training within special use or ATC sanitized airspace (MOA, restricted area, warning area, ATCAA, etc.).

4.5.1.2. Do not conduct Air-to-Air training against tanker aircraft during IMC conditions.

4.5.1.3. Minimum altitude for tanker aircraft is 3,000 feet (5,000 feet at night) above the highest obstacle or terrain within 4 NM of route centerline. Aircrew will compute a hard minimum MSL altitude using the above criteria.

4.5.1.4. Tanker aircraft may operate in the UNLIMITED maneuvering category but will not exceed 45 degrees of bank (30 degrees in cell formation).

4.5.1.5. Fighter aircrews will be CMR or BMC before participating in Air-to-Air training with tanker aircraft.

4.5.2. Composite Force Exercises and Large Scale Training (e.g., Red Flag, Cope Thunder). The following rules apply to Air-to-Air training where more than 10 aircraft are operating in the assigned airspace. During exercises supervised by 509 Weapons Squadron, Fairchild AFB deletes the following requirements at the discretion of 509 WPS commander.

4.5.2.1. Tanker aircraft will not depart assigned altitude blocks.

4.5.2.2. Restrict maneuvering to level turns, with bank angle limits as specified in **paragraph 4.5.1.4.**

4.5.2.3. Once turns are complete, tanker aircraft may descend within their assigned altitude block.

4.5.3. Small Scale Training (e.g., Composite Force Training exercise, Dissimilar Air Combat Tactics training). The following rules apply to Air-to-Air training where a total of 10 or less aircraft are operating within the assigned airspace.

4.5.3.1. Restrict maneuvering to level turns, with bank angle limits as specified in **paragraph 4.5.1.4.**

4.5.3.2. Once turns are complete, tanker aircraft may descend to no lower than the minimum altitudes specified in **paragraph 4.5.1.3.**

4.6. Special Ops/Rescue Fixed-Wing Aircraft Training Rules. This section applies to all echelons of participating commands and to all other agencies under the operational control of MAJCOMs with Special Ops/Rescue fixed-wing aircraft. In addition, these procedures apply to training agreements with other services and foreign services. The provisions of this chapter apply with the following additions:

4.6.1. Conduct Air-to-Air training in IMC only against AFSOC assigned/gained aircraft and aircraft operated under AFSOC lead command guidance with operational RWR.All aircraft must maintain continuous communications. Limit evasive maneuvering to RESTRICTED maneuvers and no altitude change. Maintain 1000’ altitude separation between participating aircraft.

4.6.2. AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance equipped with a fully functional Terrain Following Radar (TFR) may conduct IMC intercepts in airspace approved for IMC TF down to TF system limits IAW AFI 11-2MDS. Otherwise, conduct IMC intercepts training no lower than the MSA for the area.

4.7. Helicopters Training Rules. This paragraph applies to all echelons of participating commands and to all agencies under the operational control of MAJCOMs with rotary wing aircraft when at least one helicopter is participating in Air-to-Air training. In addition, these procedures apply to other services and foreign services with joint training agreements.

4.7.1. Training Rules:

4.7.1.1. Aircraft Separation: The exceptions from **paragraph 4.2.11.** for helicopter versus helicopter training are:

4.7.1.2. Helicopters will maintain 200 feet vertical separation when No-Joy.

4.7.1.3. Helicopter minimum separation for pre-briefed tail chase maneuvers during BHM sorties is 200 feet.

4.7.1.4. Helicopters may not enter or transition the altitude or block of an adversary unless one of the following conditions apply:

4.7.1.4.1. All adversaries are beyond 5 NM.

4.7.1.4.2. Tally/Visual is established on all aircraft in the group of interest and no conflict with other groups within 5 NM exists.

4.7.2. Maneuvering Categories:

4.7.2.1. UNLIMITED. IAW **paragraph 4.2.7.2.** with the following exceptions:

4.7.2.1.1. Minimum altitude is IAW MDS specific guidance.

4.7.2.1.2. Helicopter versus helicopter weather minimums are 1,000 feet vertical and 1 NM horizontal cloud clearance, 3 NM visibility, discernible horizon.

4.7.2.2. LIMITED. IAW **paragraph 4.2.7.3.** with the following exception:

4.7.2.2.1. During helicopter versus fixed-wing engagements the offensive aircraft will terminate IAW **paragraph 4.2.7.3.** The helicopter may continue beyond 180 degrees to defend against a follow-on attack from remaining aircraft from the offensive flight.

4.7.3. Additional Limitations:

4.7.3.1. Night. All night defensive maneuvering training will be LIMITED maneuver category and will comply with the appropriate AFI 11-2 MDS series weather and altitude minimums.

4.7.3.2. Fighter aircraft will remain subsonic during training conducted with helicopters.

4.7.3.3. IMC intercepts will not be conducted on helicopters.

4.8. Remotely Piloted Aircraft (RPA) Training Rules. This section applies to all agencies of participating commands and to all agencies under the operational control of MAJCOMs with RPA aircraft. The provisions of this chapter apply with the following exceptions and additions.

4.8.1. General:

4.8.1.1. Accomplish training in restricted airspace. Minimum altitude for the RPA is 5,000 feet AGL or the MSA whichever is greater.

4.8.1.2. Fighter aircrew will be CMR or BMC before conducting Air-to-Air training with RPAs.

4.8.2. Training Rules:

4.8.2.1. Prior to establishing radio/radar/datalink/visual contact, other aircraft will maintain a minimum of 1000 feet vertical or 5NM horizontal from RPA's briefed altitude block or orbit point. After radio/radar/datalink/visual contact is established, maintain 1000 feet vertical or 2NM horizontal from RPA. With radio and visual contact, maintain a 1000 foot bubble from the RPA.

4.8.2.1.1. If the aircraft is informed of RPA Lost Link or comm is lost with RPA, gain or maintain 1000 feet vertical or 5NM horizontal separation from RPA's last known position. (Aircraft will assume RPA is lost link if comm that was previously established is lost). However, if the aircraft can still maintain radar/datalink/visual deconfliction then maintain 1000 feet vertical or 2NM horizontal from RPA.

4.8.2.1.2. **(DELETED)**.

4.8.2.2. Maximum maneuvering category for an RPA is UNLIMITED with the following restrictions:

4.8.2.2.1. RPA will remain in assigned block.

4.8.2.2.2. RPA will maneuver using level turns.

4.8.2.2.3. Once turns are completed or prior to starting turns, RPAs may climb and descend within assigned block.

4.8.3. Lost Link. RPA pilot will notify the controlling agency. Controlling agency will notify all players of "RPA LOST LINK".

4.8.4. Special Provisions. Due to the limited visibility of an RPA, attacking aircraft are solely responsible for aircraft deconfliction when in RPA blocks.

4.9. Air Defense and Low/Slow Visual Identification (VID) Procedures. This section provides guidance for Air Defense Tasking (All Altitudes) and MDS Low/Slow VID RAP training specific events. Fighters acting as training aids will be NON-MANEUVERING, will fly no lower than 500' AGL, and abide by the airspeeds in **paragraph 4.9.2.6.1.- paragraph 4.9.2.6.3.**

4.9.1. Vertical Separation. Aircrew will maintain a minimum of 1,000 feet vertical separation throughout the VID when directed to conduct a beam or front conversion. Aircrew will use all available means to determine target altitude. If unable to positively determine vertical separation by 10 NM, convert the intercept to stern geometry.

4.9.2. Intercept Procedures. Apply the separation and airspeed minimums in this section after the intercept is complete and closure is under control. Fighters performing a stern aspect intercept and rendezvous to VID will adhere to the following:

4.9.2.1. Maintain a minimum of 1,000 feet vertical separation between the fighter and target aircraft until positive radar or visual contact in the stern aspect of the target.

4.9.2.2. If co-altitude, proceed no closer than 3 NM without visual contact unless positive radar contact provides target range, azimuth, and elevation.

4.9.2.3. Proceed no closer than 1 NM without positive radar lock-on providing target range, azimuth, elevation, and closure rate. (Exception: the fighter may proceed inside 1 NM with a visual contact on the target during daylight conditions or at night with NVGs IAW **4.2.9.4.**)

4.9.2.4. Proceed no closer than the following minimum slant range without a visual contact:

4.9.2.4.1. F-15/F-16: 1,500 feet.

4.9.2.4.2. **(DELETED).**

4.9.2.4.3. Minimum slant range is 500 feet. The fighter may move inside 500 feet slant range to the target if flight safety is not jeopardized and it is necessary to accomplish the mission (e.g., aiding an aircraft in distress or intelligence collection). In this case, the mission will dictate the maximum closure and minimum slant ranges required.

4.9.2.5. Without a visual contact, do not proceed inside 1 NM unless attaining an approximate co-speed (a maximum of 50 knots closure) condition.

4.9.2.6. Fighters will use the following minimum airspeeds below 5,000' AGL:

4.9.2.6.1. F-15: 22 Units AOA

4.9.2.6.2. F-16 CAT I: 13 Units AOA

4.9.2.6.3. **(DELETED)**.

4.9.2.7. Execute an immediate breakaway from the target if any of the following occurs:

4.9.2.7.1. Radar contact is lost with no visual contact and inside 3 NM.

4.9.2.7.2. Radar lock-on is lost (unless visual contact is maintained) and inside 1 NM.

4.9.2.7.3. Tally is lost and inside minimum range.

4.10. Joint Air-to-Air Training Rules. AFJI 36-2220, *Joint USAF/USA/USN/USMC Air Combat Training*, covers Interservice Air-to-Air training requirements.

Chapter 5

AIR-TO-SURFACE TRAINING

5.1. Introduction. This chapter describes procedures for tactical Air-to-Surface training. Use the procedures in this chapter along with operational command directives, ATC regulations, and letters of agreement. These weapons employment procedures provide aircrews and JTACs typical procedures for weapons employment under fixed conditions. For additional FTU or MQT restrictions and termination rules see **paragraph 5.3.8.** Find further procedures for formal course training in the applicable syllabi. For Special Operations and mobility Air-to-Surface operations, follow the guidance in this chapter and AFI11-2MDS Volumes 1 and 3, AFI 13-217, AFI 11-231. During composite air operations, AF aircrews will thoroughly brief other participants concerning the differences between their operating procedures and this AFI.

5.1.1. Air-to-Surface Training Missions:

5.1.1.1. Perform all non-nuclear delivery passes (including jettison passes), whether hot or dry, using live full scale ordnance delivery parameters to include fuze arming, safe escape, safe separation, and flight deconfliction considerations.

5.1.1.2. Avoid populated areas to the maximum extent possible when carrying externally loaded heavyweight inert or externally/internally loaded live ordnance.

5.1.1.2.1. For the purpose of this instruction, AC-130 munitions in the ammunitions storage-and-handling systems and weapons carried by helicopters are not considered live ordnance.

5.1.1.3. Prior to first release when carrying expendable ordnance (live, inert, or training), final switch configuration for weapon release will not be accomplished until the aircraft is in such a position that any accidental release will be contained within the range. MAJCOMs or theater COMAFFOR will develop specific guidance for armament system configurations for multiple passes. Refer to aircraft specific AFI 11-2MDS series operating procedures and individual range supplements for additional guidance.

5.1.1.4. Do not conduct simulated attacks against off-range or manned targets with internally/externally loaded live ordnance or externally loaded heavyweight inert ordnance. This restriction does not apply to 20/30mm ammunition, BDU-33s, 2.75 inch TP rockets, or non-expendable training assets (e.g. captive air-to-air and Maverick missiles, GBU-15 captive flight trainer, etc.).

5.1.1.4.1. Simulated attacks against off-range targets or any manned targets are permitted with expendable training ordnance loaded on the aircraft only IAW AFI 11-2MDS series regulations and local guidance for specific cockpit configurations and switch settings/actuations. If guidance is insufficient or a reasonable possibility exists that inadvertent/unintentional release may cause injury, death, or destruction of property, then simulated attacks off-range or against manned targets are prohibited.

5.1.1.5. The use of the “combat” laser mode of a laser designator is restricted to laser certified ranges. All air-to-surface laser operations on-range will be IAW the AFI 13-212, volume set, AFI11-MDS, and local range procedures.

5.1.1.5.1. Off-range laser emissions are not authorized unless in the "eye-safe" training frequency.

5.1.1.5.2. Reference **paragraph 4.2.5.** for further guidance on Air-to-Air Laser Employment.

5.1.1.5.3. When working with ground personnel, aircrew will inform them prior to employing lasers in the combat mode. Upon acknowledgement, ground personnel will ensure proper eye protection is in place.

5.1.1.6. Aircraft employing Inertial Aided Munitions (IAMs) in a bomb-on-coordinate mode or aircraft employing any ordnance in a system delivery mode on coordinates only will adhere to the following prior to release:

5.1.1.6.1. Aircrew will confirm the accuracy of the aircraft navigation and weapon delivery systems IAW MDS specific publications.

5.1.1.6.2. Aircrew will ensure accurate receipt and entry of target coordinates and that they come from a valid target source. These coordinates will be verified via read-back from target data entry displays or will be cross-checked with mission planning data or range guides but must include one other person verifying coordinate/elevation accuracy (either in-flight or during mission planning). Examples of valid target sources include, but are not limited to RCOs, JTACs, Range Guides, or FAC-A qualified aircrew.

5.1.1.6.3. Aircrew will use all means available to verify accuracy of target coordinates/elevation, and that the coordinates are within the anticipated target area. Examples of available means include but are not limited to, TGP, FLIR, radar, SAR map, HUD cueing, other aircraft sensors, terrain pointers, map plots, data links, radio communications, talk-ons with JTACs, RCOs, other aircrew members, etc.

5.1.1.6.4. Aircrew will confirm and adhere to published range operating procedures and restrictions, including any additional MDS-specific weapons delivery requirements.

5.1.1.7. When ordnance is employed, minimum safe distances of personnel from all targets will comply with WDZ footprints as described in AFI 13-212 or local directives, whichever are more restrictive. **CAS/air-to-ground EXCEPTION**: TACP/JTACs and aircrews conducting airborne CAS/air-to-ground training will use **Attachment 6 –** *Minimum Safe Distances for Ground Parties (Live Fire Training)* Table. If unable to meet the assumptions outlined in **A6.1.** TACP/JTACs and aircrews will then use WDZ distances as outlined above. Risk estimate distances listed in JP 3-09.3, and J-FIRE are for combat use only. HQ ACC/A3A is the USAF executive agent for procuring and modifying WDZ weapon safety footprints.

5.1.1.8. For missions falling under the Joint Live Fire definition, refer to **Attachment 4** for additional guidance.

5.2. Authorized Employment Patterns:

5.2.1. Class A Range. Flights will fly the same delivery pattern (rectangular, pop attacks, etc.); however, aircrews may mix events or delivery modes when using the same target, same

type delivery, and if approved by the Range Control Officer (RCO). Fly radio-silent attacks, random attacks, element tactics, split pop-up attacks, etc., only if allowed by range procedures, if prebriefed, and if approved by the RCO.

5.3. Air-to-Surface Training Rules. See **paragraph 5.5.** for additional night rules.

5.3.1. Weather Minimums (AFSOC aircraft, aircraft under AFSOC oversight, or AFSOC gained aircraft refer to MAJCOM/MDS guidance):

5.3.1.1. For VMC operations the ceiling must be 1,500 feet AGL, or at least 500 feet above the highest portion of the weapons delivery pattern, whichever is higher. (N/A for level deliveries above 5,000'AGL.)

5.3.1.1.1. Visibility will be at least 3 NM for fixed-wing and 2 NM for helicopters (USAFE 5 KM for fixed-wing and 3.5 KM for helicopters).

5.3.1.1.2. Daylight weapons delivery events on over water ranges require a discernible horizon unless TF/TA equipped.

5.3.1.2. For IMC deliveries, deliveries through an undercast, level deliveries above 5,000 AGL and/or TF operations, the ceiling and visibility must be IAW AFI 11-2MDS series aircraft instructions and range supplements.

5.3.2. Range Entry:

5.3.2.1. Before weapons delivery on Class B/C ranges, positively identify the authorized target and confirm the target area is clear of unauthorized persons or vessels (with on board or remote sensors, or via reports from authorized sources). Range personnel, to include those who directly observe or use remote WISS/TOSS scoring cameras, FAC(A)/JTAC, IG chase aircraft, departing flights or other aircraft sharing the range are authorized sources that may be used to ensure the target area is clear. If the target area cannot be cleared by these means, perform a dry clearing pass/ dry FRA before weapons delivery.

5.3.2.2. If planning weapons delivery requiring visual acquisition of the target (e.g. visual delivery, TGP, FLIR delivery), accomplish a dry familiarization pass when an aircrew has not been on that range for more than 1 year. Aircrew will familiarize themselves with range boundaries, target locations, and friendly locations on the range. If the familiarization pass is flown as a dry FRA, aircrew must familiarize themselves with the range and the range must still be cleared as stated above prior to expending ordnance. See **paragraph 5.5.1.5.** for additional night restrictions and **Attachment 4** for additional joint live fire restrictions.

5.3.3. Conventional range pattern operations are limited to a maximum of four attacking aircraft at any one time.

5.3.4. Single-Ship Operations. See **paragraph 3.3.** for additional restrictions (N/A for AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance and Helicopters).

5.3.4.1. Class A Ranges. CMR and BMC aircrew may perform single-ship conventional and nuclear deliveries (to include pops). MQT aircrew may perform

single-ship conventional and nuclear deliveries only if there is an instructor or squadron supervisor in the aircraft.

5.3.4.2. Class B/C Ranges or Off-Range Simulated Deliveries:

5.3.4.2.1. Under the control of a JTAC/FAC(A), CMR/BMC aircrew, and MQT with an instructor or squadron supervisor in the A/C and FTU students with an instructor in the A/C may accomplish level, climbing, and diving deliveries (including pops), and maverick attacks.

5.3.4.2.2. When not under the control of a JTAC/FAC(A), CMR/BMC aircrew, and MQT with an instructor or squadron supervisor in the A/C and FTU students with an instructor in the A/C may accomplish level, climbing, and diving deliveries, and maverick attacks. Minimum recovery altitude for diving deliveries or Maverick attacks is 4,500' AGL.

5.3.4.3. CMR/BMC flight leads or FAC(A) aircrew may perform single-ship low altitude tactical navigation (LATN) to their minimum altitude qualification. Wingmen and MQT aircrew may perform single-ship LATN only if there is an instructor or squadron supervisor in the aircraft. Exception: T-38 CTP aircraft with two rated aircrew on-board may fly LATN.

5.3.4.4. To preclude landing with live or inert heavyweight ordnance, MQT/IQT aircrew may fly a single-ship mission to an appropriate range and release ordnance on one, non-tactical pass above the fragmentation envelope derived from CWDS.

5.3.4.5. Qualified FAC(A)s may perform full mission profiles while single-ship IAW AFI11-2MDS procedures.

5.3.5. Switch Changes. Range restrictions permitting, cockpit switch changes that are accomplished by the pilot flying the aircraft will be made prior to the final attack heading unless normally required for system-aided deliveries or tactics (N/A for HOTAS).

5.3.6. Minimum Altitudes. See **paragraph 5.5.** for additional night minimums.

5.3.6.1. Determine minimum release and recovery altitudes by using the fuzing and fragmentation envelopes established in aircraft specific weapons delivery T.O.s, Conventional Weapons Delivery Software (CWDS), AFI 11-2MDS series guidance, or this instruction, whichever is higher.

5.3.6.2. In addition to the minimum altitudes established in AFI 11-2MDS Vol 1 guidance, apply the following minimum altitudes:

5.3.6.2.1. Level Deliveries: 200 feet (50 feet for helicopters, N/A for hover fire).

5.3.6.2.2. LAHD: 300 feet on a Class B/C.

5.3.6.2.3. Nuclear and Radar Events: 200 feet.

5.3.6.2.4. Low Angle Strafe/Long Range Strafe/Two Target Strafe (LAS/LRS/TTS): 75 feet (50 feet for helicopters).

5.3.6.3. Pilots will not descend below their designated low-level category at any time (for example, conventional downwind, approach to a pop-up point), unless on final for low angle bombing, low angle rockets, level bombing, and LAS/LRS/TTS attacks.

5.3.6.4. For nuclear weapons delivery patterns, use a minimum of 1,000 feet AGL on downwind except when operating with a Terrain Following (TF) or Terrain Avoidance (TA) system.

5.3.7. Abort Criteria. Along with the general criteria set in **paragraph 3.4.** (KIO and Terminate Procedures), cease-fire and/or abort the pass and do not release if any of the following situations occur:

5.3.7.1. If friendly troops and/or JTAC position near target area is inside minimum distance restrictions or friendly position cannot be confirmed (see **paragraph 5.1.1.7.**).

5.3.7.2. If over water and the discernible horizon or the land-water contrast is lost (N/A for AC-130s, helicopters, or aircraft with a TF/TA system).

5.3.7.3. If unable to positively identify the target or confirm correct target coordinates for IAM deliveries or system deliveries in coordinate only mode.

5.3.7.4. If the aircraft passes below the minimum recovery cue/altitude, established in AFI11-2MDS series guidance, this chapter, or the planned minimum recovery for the event being flown.

5.3.7.5. If unsatisfactory entry or release conditions exists. Note: Abort the pass if the actual dive angle will exceed the planned dive angle by more than 5 degrees at release (10 degrees if the planned recovery altitude is 10,000 feet or above).

5.3.7.6. If airspeed drops below minimums specified in appropriate AFI 11-2MDS series regulations.

5.3.7.7. **(For A/OA-10 aircraft)** If aircraft is within 3,000 feet slant range from a hard target during LRS/LAS/TTS. Note: Aircraft will not approach within 500’ or cross the 3-9 line of any hard target being shot during aircraft recovery.

5.3.8. FTU and MQT Restrictions and Termination Rules (N/A for helicopters):

5.3.8.1. Students will not change targets once initiating roll-in to final except during Two Target Strafe (TTS).

5.3.8.2. Pop-up Restrictions.

5.3.8.2.1. Terminate a pop-up attack if the actual pull-up point is inside the planned pull-up point.

5.3.8.2.2. Do not perform pop-up attacks from fighting wing or closer position.

5.3.8.2.3. Terminate the pass if the roll-in will require less than 15 degrees or more than 90 degrees of turn.

5.3.8.3. LANTIRN students will fly direct pop attacks only when engaged in syllabus directed training missions.

5.3.9. Weapons Delivery Spacing:

5.3.9.1. Use the following minimum spacing on final during level or climbing deliveries with training ordnance:

5.3.9.1.1. Level - Minimum formation deconfliction spacing time for the ordnance simulated or 15 seconds, whichever is greater.

5.3.9.1.2. Climbing - 30 seconds.

5.3.9.1.3. When subsequent aircraft conduct a delivery that requires target over flight following a climbing delivery by a preceding aircraft, use bomb time-of-fall from release plus 30 seconds to ensure the subsequent aircraft crosses the target after bomb impact.

5.3.9.2. Use T.O. 1-1M-34 or CWDS to determine minimum spacing when employing live ordnance.

5.3.10. Fouls:

5.3.10.1. Assess a foul for any of the following reasons:

5.3.10.1.1. Violation of flight or range safety.

5.3.10.1.2. If an aircraft passes below the minimum recovery cue/altitude as established in AFI 11-2MDS series instructions or this instruction for the event being flown.

5.3.10.1.3. An unintentional double-firing burst versus a single target or strafing past the foul line.

5.3.10.1.4. A lazy recovery from a LAS/LRS/TTS pass resulting in the aircraft descending below 75 feet.

5.3.10.1.5. Aircraft expending on wrong target.

5.3.10.1.6. Aircraft expending ordnance without clearance.

5.3.10.2. Aircrews will not perform further deliveries after receiving a second foul on the range or a single dangerous foul, or as determined by the RCO or flight lead.

5.3.11. Last Strafe Pass Procedure. The last strafe pass will be dry unless each aircraft accomplishes an escape maneuver and an immediate turn after recovery. If performing a dry pass, check switches in SAFE, SIM, OFF, or equivalent position before initiating the last pass (N/A for helicopters).

5.3.12. Armament Safety Procedures:

5.3.12.1. After completing weapon deliveries, flight leads will reform their flights and obtain an armament safety check from each flight member and perform a battle damage check. Battle damage checks are not required at night or in IMC. (B-52 aircrew may perform the battle damage check at discretion of flight lead.)

5.3.12.2. If unable to confirm ordnance expenditure on the range, perform a visual bomb check. The aircrew, RCO, JTAC, B-1 Stores Management System (SMS), B-2 Mission Management System, B-52 Stores Management Overlay for MIL-STD-1760 weapons, or another flight member can all confirm ordnance expenditure. If visual confirmation is not feasible (for example, night), follow hung ordnance or unconfirmed hung ordnance procedures.

5.3.13. Recovery From Delivery. Execute recoveries from weapons deliveries according to safe escape maneuvers described in T.O. 1MDS-34-1-1 aircraft specific T.O.s. Recoveries will observe minimum altitudes consistent with safe escape, fuze arming, and

the weapon delivery minimum altitudes established by AFI 11-2MDS series guidance, T.O. 1-1M-34, CWDS, range supplements, and this instruction, whichever are higher. Turning maneuver safe escapes resulting in a descending turn are not authorized.

5.3.13.1. When performing loft and toss deliveries, aircrews will plan and fly recovery to ensure aircraft and munitions deconfliction, including other aircraft's munitions if performing simultaneous deliveries.

5.3.14. Flight Composition. A tactical unit possessing dissimilar fighters with integrated missions (e.g., SEAD aircraft, buddy lasing, etc.) may employ as mixed elements when tactically sound.

5.3.15. Release Authority. Only a fully qualified Range Control Officer or a JTAC/FAC(A)/flight lead when approved by an RCO are authorized to allow ordnance release on a Class A range. A JTAC/FAC(A) or flight lead (for own flight) is authorized to allow ordnance release on Class B or C ranges as directed in the applicable range order.

5.4. Range Radio Procedures. See **paragraph 5.5.** for additional night radio procedures.

5.4.1. Radio Contact. Do not expend ordnance on a Class A or Class B/C manned range without two-way radio contact with the RCO or JTAC on duty. Aircrew will acknowledge all applicable transmissions by the RCO or JTAC.

5.4.2. Range Entry. Before weapons delivery on a Class A range (or when using scoring on a Class B range), flight leaders will confirm the lineup and events. The RCO will confirm range, traffic pattern (when applicable), altimeter setting, and strafe panel (when applicable). The flight lead will read back the applicable range, traffic pattern, altimeter setting, and strafe panel. Flight members acknowledge with callsign (e.g., "Viper 21, Right Range, Left Traffic, 29.92," "2," "3," "4").

5.4.3. Class A Range Standard Radio Calls:

5.4.3.1. Day Conventional:

5.4.3.1.1. "Call Sign, BASE."

5.4.3.1.2. "Call Sign, UP" (pop-up patterns only).

5.4.3.1.3. "Call Sign, IN" and add "Dry" if appropriate. Abort the pass without clearance to drop ordnance. (Day Conventional passes do not require an "OFF HOT" call)

5.4.3.1.4. "Call Sign, OFF, DRY" if intent was to release but no weapon was released.

5.4.3.2. Night Conventional. Local directives may require additional radio calls during night employment on a Class A range.

5.4.3.3. Nuclear patterns and conventional bomber racetrack patterns:

5.4.3.3.1. "Call Sign, BASE."

5.4.3.3.2. "Call Sign, FINAL (Event)."

5.4.3.3.3. "Call Sign, OFF HOT or DRY."

5.4.4. Modify radio calls on a Class B or C ranges to suit the tactical situation (for example, communications jamming).

5.4.5. In addition to the clearance procedures in JP 3-09.3, the following clearance calls will be used by FAC(A)/JTAC/RCO during dry employment.

5.4.5.1. "CONTINUE DRY" used to provide clearance to aircraft for dry employment during a type 1 or type 2 control.

5.4.5.2. "TYPE 3, CONTINUE DRY" used to provide clearance to aircraft for dry employment within the parameters imposed by the FAC(A)/JTAC during a type 3 control.

5.4.5.3. The word "CLEARED", in conjunction with any ground attack commencement comm, will only be used when ordnance is actually to be delivered. This will minimize the chances of dropping ordnance on dry passes further reducing the risk of fratricide. Non-standard calls must be avoided at all times.

5.5. Night Surface Attack Procedures (N/A AFSOC assigned/gained aircraft, aircraft operated under AFSOC lead command guidance). See **paragraph 3.8.** for additional guidance.

5.5.1. Night Weapons Delivery Patterns. At night observe the following additional requirements (AFSOC assigned/gained aircraft, aircraft operated under AFSOC lead command guidance follow AFI 11-2MDS/MAJCOM guidance):

5.5.1.1. Aircraft lighting will be full-up IAW **paragraph 3.8.2.** unless operating in designated airspace. Aircraft operating in designated airspace may use lighting options IAW AFI 11-202, Vol 3 and waivers. Reduced, Covert, and Lights-Out settings are authorized in designated airspace only.

5.5.1.2. If conducting training with an RCO/JTAC, the RCO/JTAC must have an illumination device to make his/her position readily discernible to NVG-equipped aircraft. NVG aircraft will use external lighting that allows the RCO or JTAC to observe the aircraft in the pattern. If aircraft are employing covert or lights out, the RCO/JTAC will be properly equipped and trained with NVGs.

5.5.1.3. Minimum in-flight visibility for visual attacks is 5 NM (3 NM for helicopters).

5.5.1.4. For visual deliveries, illuminate the target area with airborne flares or ground marking devices unless expending on a lighted target (Class A range). Night radar bombing, TGP, FLIR, Pave Penny, IR Maverick attacks, NVG, RPAs or B-52 aircraft do not require artificial illumination of the target (see **paragraph 5.5.3.**).

5.5.1.5. Night Class B/C Dry Clearing Pass. Aircrews may perform a combination dry first run attack, range clearing pass only during a level delivery at an altitude that will allow for positive clearing of the range, but no lower than outlined in **paragraph 3.8.3.**

5.5.1.6. Operate no more than three aircraft, (or four FLIR or NVG-equipped aircraft) using either an A/A TACAN or A/A radar in the same conventional pattern. All conventional patterns will provide adequate spacing to allow aircrews to focus primarily on aircraft control vice aircraft deconfliction.

5.5.1.7. The minimum altitude for aircraft during night surface attack operations will be IAW **paragraph 3.8.3.** and **paragraph 5.5.2.3.**

5.5.1.8. Range restrictions permitting, cockpit switch changes that are accomplished by the pilot flying the aircraft will be made prior to the final attack heading unless normally required for system-aided deliveries or tactics. (N/A for HOTAS)

5.5.1.9. Aircrews will not attempt to air score own-ship deliveries.

5.5.1.10. Continuously monitor flight instruments due to depth perception and altitude/attitude perception difficulties.

5.5.1.11. IR pointer employment. For IR pointer TTPs, reference JP 3-09.3 and AFI 11-MDS. IR pointers referenced in this section are LCPs (ACP-2A/2B, GCP-1A/1B/1C, LP-1000, IZLID1000P-A1), ATPs (LITENING, Sniper XR), and MTS (MQ-1/9). For simplicity, a reference to 'IR pointer' is a reference to all devices just listed.

5.5.1.11.1. Laser Eye Protection (LEP) with side protection must be worn when employing a laser command pointer (LCP) in the cockpit, where a reflection hazard exists, or during a ground test.

5.5.1.11.1.1. Put on LEP (when required) prior to removing the LCP safety cap.

5.5.1.11.1.2. Aircraft commanders/flight leads will confirm LCP employing aircrew/flight members are wearing LEP prior to anyone employing an LCP under any conditions where a reflection hazard exists.

5.5.1.11.1.3. Aircrew will notify ground personnel and other aircraft in the working area prior to employing IR pointer. For specific missions that require minimal/no external comm, pre-mission coordination (when/where IR pointer will be used) satisfies this notification requirement. When required, ground personnel will ensure proper eye protection is in place.

5.5.1.11.1.4. Remove and stow LEP prior to take-off, air-to-air refueling, and landing. (N/ A for enlisted aircrew positions.)

5.5.1.11.2. Fixed-wing aircraft will adhere to the following minimum slant range separation between IR pointer employing aircraft and other aircraft (assumes no LEPs and no magnifying devices are being used in other aircraft). 1,000 feet slant range for LCP (ACP-2A/2B, GCP-1A/1B) and LITENING ATP. 2,000 feet slant range for MTS and Sniper XR ATP. 3,000 feet slant range for LCP (GCP-1C, LP-1000, IZLID 1000P-A1).

5.5.1.11.3. Minimum Employment Altitudes and Slant Ranges. If all personnel in the area to be designated are wearing LEPs, the minimum IR pointer employment altitude is 1,000 feet AGL for fixed-wing aircraft. In this case, there is no minimum altitude for rotary-wing aircraft LCP employment provided the LCP is not pointed toward any aircraft, person or specular surface (i.e. water, glass, mirrors, reflecting surfaces, etc.).

5.5.1.11.3.1. If non-LEP equipped personnel are in the area to be designated and it is verified that no image-magnifying devices (binoculars, telescopes, etc.) are in use, minimum IR pointer employment slant range is 3,000 feet. If slant range cannot be determined the minimum employment altitude is 3,000 feet AGL.

5.5.1.11.3.2. If non-LEP equipped personnel are in the area to be designated and

unable to ensure the absence of personnel using image-magnifying devices (binoculars, telescopes, etc.) in the area to be designated, IR pointer employment is restricted as follows.

5.5.1.11.3.2.1. LCP (ACP-2A/2B, GCP-1A) and LITENING ATP. The minimum slant range is 10,000 feet. If slant range cannot be determined the minimum employment altitude is 10,000 feet AGL.

5.5.1.11.3.2.2. MTS. The minimum slant range is 14,000 feet. If slant range cannot be determined the minimum employment altitude is 14,000 feet AGL.

5.5.1.11.3.2.3. Sniper XR ATP. The minimum slant range is 24,000 feet. If slant range cannot be determined the minimum employment altitude is 24,000 feet AGL.

5.5.1.11.3.2.4. Additional LCPs. GCP-1B min slant range is 17,000 feet, use 17,000 feet AGL as min if unable to determine slant range. GCP-1C min slant range is 30,000 feet, use 30,000 feet AGL as min if unable to determine slant range. LP-1000 min slant range is 26,000 feet, use 26,000 feet AGL as min if unable to determine slant range. IZLID 1000P-A1 min slant range is 34,000 feet, use 34,000 feet AGL as min if unable to determine slant range.

5.5.1.11.4. Aircrew will make an "IR Pointer Safe" call when IR pointer use is terminated for the mission and the safety cap (handheld LCP only) is in place.

5.5.2. Night Visual Weapons Delivery Pattern (N/A for AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance and helicopters):

5.5.2.1. Maximum planned dive angle is 45 degrees.

5.5.2.2. Minimum downwind altitudes will be 1,500 feet AGL or according to **paragraph 3.8.3.**

5.5.2.3. Aircrews not utilizing TFR will begin their recoveries to ensure that their aircraft does not go below the following minimum altitudes:

5.5.2.3.1. NVG Equipped Aircraft.

5.5.2.3.1.1. 1,000 feet AGL for planned dive angles up to 45 degrees (HI).

5.5.2.3.1.2. 1,000 feet AGL or MSA, whichever is higher for planned dive angles up to 45 degrees (LI).

5.5.2.3.1.3. **(DELETED)**.

5.5.2.3.1.4. During low illum conditions the use of artificial illum devices (e.g. LUU-2, LUU-19, illum rockets), may allow for high illum recovery altitudes. The flight lead will make this determination based on the ability to identify terrain features and/or obstacles in the target area.

5.5.2.3.2. Non-NVG Equipped Aircraft.

5.5.2.3.2.1. 2,000 feet AGL or MSA, whichever is higher for planned dive angles greater than 20 degrees up to 45 degrees?

5.5.2.3.2.2. **(DELETED)**.

5.5.2.3.2.3. 1,000 feet AGL or MSA, whichever is higher for dive angles of 20 degrees or less?

5.5.3. Night System Weapons Delivery Pattern: A "Night System" is a device that allows the aircrew to identify the target when normal visual acquisition is not possible. (N/A for AFSOC assigned/gained fixed-wing aircraft, and fixed-wing aircraft operated under AFSOC lead command guidance).

5.5.3.1. Aircraft equipped with TGP, FLIR, ground mapping radar, or NVG, and RPA aircraft may fly events on class A, B or C ranges.

5.5.3.2. Minimum altitude on downwind is 1,500 feet or MSA, whichever is higher. Descend to release altitude when established on final. Range operations permitting, TF/TA equipped aircraft may operate at AFI 11-2MDS limits.

5.5.3.3. Minimum spacing between deliveries is 60 seconds. Bomber aircraft, TGP, FLIR or NVG equipped aircraft may use daylight rules of minimum spacing when operating with an A/A TACAN or an A/A radar.

5.5.3.4. Maximum angle of bank during TGP recovery maneuvers from a loft or climbing safe escape is 135 degrees. Descend no lower than MSA until within TF limits.

5.5.4. Night Illumination Flare Procedures:

5.5.4.1. Computations. Mission requirements and effects desired will dictate criteria used. Plan the minimum altitude for flare release to ensure illumination flare burnout before ground impact.

5.5.4.2. Class B and C Range radio procedures are same as day (see **paragraph 5.4.4.**).

5.5.4.3. Dud Flare Procedures. If a dud flare is suspected, cease range operations until the flare is no longer a hazard.

5.5.4.4. Determining Flare Release Points. Determine the release point by a FAC(A)/JTAC, GPS/ INS coordinates, radar vector, dead reckoning, computed systems (CCRP) or by the RCO. If position is uncertain, do not attempt a flare release.

5.5.4.5. Flare Patterns. Flare patterns and procedures are variable. Timing during the flight break-up must position the first delivery aircraft on the downwind leg as the flareship releases flares. Make flare drop and ordnance deliveries in any sequence that provides continuous illumination of the target area.

5.5.4.6. Flare Support Aircraft Coordination. Establish positive coordination between flare support aircraft, weapons delivery aircraft, and RCOs to ensure a mutual understanding and knowledge of the overall operation. Specific briefing items will include:

5.5.4.6.1. Range entry, exit, and deconfliction procedures.

5.5.4.6.2. Pattern altitude and direction.

5.5.4.6.3. Expected number of flares dropped on each pass for each different event.

5.5.4.6.4. Dud flare procedures.

5.6. Live Ordnance Procedures:

5.6.1. Do not select live ordnance stations until within range boundaries and ready for delivery. Do not arm delivery systems unless there is intent to expend and according to range procedures.

5.6.2. Weapons safety footprints and min-safe distances of personnel from targets will be IAW **paragraph 5.1.1.7.**

5.6.3. Following all live ordnance deliveries accomplish a bomb check and battle damage check at the earliest opportunity. (B-52 aircrew may perform a battle damage check at discretion of flight lead.)

5.6.4. Maverick Employment:

5.6.4.1. If multiple elements are in the formation, non-firing elements will maintain a position clear of the firing element and/or stacked high.

5.6.4.2. If missile launch has not occurred before reaching minimum range, abort the pass.

5.6.5. For missions falling under the Joint Live Fire definition in **Attachment 4**, refer to that attachment for additional guidance.

5.6.6. For employment of live IAMs during CAS, refer to **paragraph 5.9.** for further guidance.

5.7. Operations with Naval Ships. The following additional rules apply during maritime training when not covered by published joint exercise SPINS. For helicopter shipboard operations, refer to JP3-04.1, *Joint Tactics and Procedures for Shipboard Helicopter Operations*".

5.7.1. The following restrictions govern flight in the proximity of non-participating ships:

5.7.1.1. Do not penetrate a 1 NM bubble vertically or horizontally.

5.7.1.2. Do not fly more than two aircraft in the immediate vicinity.

5.7.1.3. Do not perform any provocative or aggressive acts, or any acts reasonably perceived as provocative or aggressive.

5.7.1.4. Do not expend ordnance within l0 NM (for AFSOC assigned/gained aircraft, and aircraft operated under AFSOC lead command guidance, see AFSOC specific instructions).

5.7.1.5. Limit uses of a nonparticipating surface ship to navigation practice setups only. Do not use nonparticipating surface ships with heavyweight ordnance on-board.

5.7.2. Rules during training with participating ships must be according to prebriefed naval SPINs for the ships concerned. In no case will aircraft penetrate a 500-foot bubble around exercise ships.

5.7.3. During multiple sector attacks, maintain a 1,000 foot minimum altitude differential between converging single aircraft. Maintain a 2,000 foot differential between converging elements.

5.7.4. A maximum of two aircraft will engage in near simultaneous attacks (10 seconds minimum spacing) on the same target. The second aircraft must maintain visual contact.

5.7.5. A maximum of four aircraft can attack a single target with a minimum of 20 seconds between elements.

5.7.6. A maximum number of eight aircraft can attack a simulated Surface Action Group (SAG) of two or more targets simultaneously.

5.7.7. The minimum distance between simulated SAG targets is 1 NM for simultaneous attacks.

5.7.8. Aircrews will not attack targets outside their prebriefed attack quadrant.

5.7.9. Aircrews will not attack into reflected sunlight.

5.7.10. An in-flight heading check is mandatory upon initiating recovery from maritime training.

5.8. Air Strike Control Procedures:

5.8.1. Air strikes during CAS operations will be conducted in accordance with JP 3-09.3 and must be controlled by a qualified FAC(A)/JTAC. FAC(A)/JTAC students in a formal course/upgrade and all other personnel receiving CAS familiarization training require a qualified FAC(A)/JTAC instructor's supervision while controlling air strikes in CAS training. All non-JTAC qualified personnel are required to identify themselves as non-JTAC qualified to aircrew during initial check-in (eg. "Hog 01, this is Grunt 69, I am a JFO. I am not JTAC qualified."). AC-130s do not require FAC(A)/JTAC control, but do require an AC-130 call-for-fire qualified individual to be present during CAS training. Non-attack rotary wing aircraft (eg. HH-60, UH-1, CH-47, MH-47) conducting CSAR training do not require FAC(A)/JTAC control when supporting calls-for-fire, but do require a call-for-fire qualified individual to be present.

5.8.1.1. NATO FACs that control air strikes will adhere to JP 3-09.3 CAS procedures and must have the following qualification: NATO Combat Ready Day High/Day Low/Night High/Night Low FAC in accordance with NSA STANAG 3797. Any NATO FAC that does not have this qualification must be under the direct supervision of a US JTAC instructor to control air strikes in CAS training.

5.8.2. Troop and target identification is critical. All available means (map plot, aircraft systems, target mark, target talk-on, etc.) will be utilized to positively identify the target. Aircrew and JTACs will ensure the position(s) of friendly forces are deconflicted from ordnance footprints before expending IAW **5.1.1.7.**

5.8.3. JTACs will wear protective gear IAW AFI 13-112 Vol 1.

5.8.4. Aircraft Deconfliction.

5.8.4.1. When using altitude deconfliction, the following guidance will apply:

5.8.4.1.1. A minimum of 1,000 feet vertical separation between altitude blocks is required at or above 5000 feet AGL.

5.8.4.1.2. A minimum of 500 feet vertical separation between altitude blocks is required below 5,000 feet AGL.

5.8.4.1.3. Aircraft will verbally confirm all altitude restrictions.

5.8.4.2. Aircraft will not transit or exit the assigned altitude, altitude block, or deconfliction sector, to include weapons employment, unless cleared or acknowledged by FAC(A)/JTAC.

5.8.4.3. If timing is used as deconfliction, aircrew will inform the JTAC/FAC(A) if planned timing will not be met.

5.8.4.4. In addition to on-board systems and the established deconfliction plan, each participant must use "see and avoid" techniques.

5.8.4.5. Aircrew will initiate a "TERMINATE" or "KNOCK IT OFF" IAW **paragraph 3.4.** criteria if deconfliction breaks down.

5.8.5. JTACs own the final release clearance authority. If JTACs choose to relinquish the final release clearance authority (e.g., to FAC (A), etc.), JTACs must ensure that a clear, concise, and positive handoff occurs with a current and qualified air/ground controller.

5.8.6. All players have the authority and responsibility to call "KNOCK-IT-OFF" or abort the pass if they deem safety to ground crew is in jeopardy.

5.9. Additional Procedures for CAS Operations with Inertially Aided Munitions (IAM)

5.9.1. General. JTAC/FAC(A) personnel and aircrews will use the following procedures in addition to the procedures in JP 3-09.3, local directives, range supplements, and applicable 11-2MDS during CAS operations with IAMs.

5.9.1.1. In addition to meeting range, airspace, and theater restrictions, aircrew is responsible for system and weapon targeting accuracy IAW **5.1.1.6.**

5.9.2. Procedures.

5.9.2.1. Aircrews will receive a CAS 9-line briefing and read back 9-line information IAW JP3-09.3. JTAC/FAC(A)s may request read back of any items.

5.9.2.1.1. JTAC/FAC(A)s will confirm with the aircrew that WGS-84 is being used and what coordinate format is required (e.g., "latitude/longitude, in degree, minutes, and decimal minutes"), and which elevation format is being used (e.g. Height Above Ellipsoid, MSL, meters vs. feet).

5.9.2.2. When performing a non-visual IAM delivery, aircrew will transmit the target elevation and location accepted by the weapon to the JTAC for verification. If applicable, the aircrew will notify what aircraft sensor will be used to affect a release and the target description, e.g., "releasing on radar on the northern most tank in a line of five".

5.9.2.3. **(DELETED)**.

5.10. Operations with JSTARS. The following additional procedures apply during Air-to-Surface training with JSTARS: (***Note:*** - In the absence of Joint STARS or other applicable agencies, AWACS may conduct C2 of CAS. Reference **Attachment 3** for coordination).

5.10.1. **Attachment 2** "General Coordination and Briefing Guide" and **Attachment 3** "CAS Coordination and Briefing Guide" provides a general coordination sheet. Execution specifics will be delineated between the aircrew and AWO/WD.

5.10.2. All JSTARS air-briefs will be IAW AFTTP 3-1.30, **Attachment 2**, Air-to-Ground Comm Standards.

5.10.3. JSTARS has no inherent identification capability. All target identification requires off-board cross-cueing.

5.10.4. JSTARS does not provide positive-radar control of aircraft. JSTARS provides procedural control of aircraft using time, altitude, and geographic (lateral) separation to ensure deconfliction. The deconfliction method may be delineated in the ACO, SPINS, or real-time tactical briefs.

5.10.5. JSTARS will not provide airspace monitoring. Maintaining airspace confines is an aircrew responsibility.

5.11. Operations with RPAs. All provisions of this chapter apply with the following exceptions and additions.

5.11.1. Briefing:

5.11.1.1. A face to face or telephonic briefing between RPA pilot and attacking aircraft/FAC(A) is desired. Whether briefed prior to the mission or airborne, the following items will be covered:

5.11.1.1.1. Attacking aircraft/FAC(A) block.

5.11.1.1.2. RPA block.

5.11.1.1.3. RPA Lost Link profile/altitudes.

5.11.1.1.4. Contact frequencies.

5.11.2. Deconfliction:

5.11.2.1. Prior to establishing radio/radar/datalink/visual contact, attacking aircraft/FAC(A) will maintain a minimum of 1000 feet vertical or 5NM horizontal from RPA's briefed altitude block or orbit point. After radio/radar/datalink/visual contact is established, maintain 1000 feet vertical or 2NM horizontal from RPA. With radio and visual contact, maintain a 1000 foot bubble from the RPA. (N/A for AFSOC tactical RPAs if deconfliction is otherwise coordinated).

5.11.2.2. RPA will relay position, in relation to the target, to attacking aircraft/FAC(A) prior to attack.

5.11.2.3. Aircraft run-in heading and egress will be planned to maintain separation from RPA IAW **paragraph 5.11.2.1.** Attacking aircraft will not overfly RPA position during run-in with expendable ordnance.

5.11.3. Lost Link:

5.11.3.1. If the attacking aircraft/FAC(A) is informed of RPA Lost Link or comm is lost with RPA, gain or maintain 1000 feet vertical or 5NM separation from RPA's last known position. (Aircraft will assume RPA is lost link if comm. that was previously

established is lost). However, if the attacking aircraft/FAC(A) can maintain radar/datalink/visual deconfliction then maintain 1000 feet vertical or 2NM horizontal from RPA. RPA pilot will notify the controlling agency. Controlling agency will notify all players.

5.11.4. Special Provisions:

5.11.4.1. Due to limited visibility of the RPA, manned aircraft are solely responsible for deconfliction IAW **paragraphs 5.11.2.** and **paragraphs 5.11.3.** of this chapter.

5.11.4.2. Due to limited visibility RPA pilots are not FAC(A) qualified. Ordnance release authority rests with the FAC(A)/JTAC or Flight Lead. In some cases AFSOC/SOCOM tactical RPAs could be operated by individuals who are JTAC qualified and will have clearance authority.

5.12. Information Collections, Records, and Forms.

5.12.1. Information Collections. No information collections are created by this publication.

5.12.2. Records. No records are created by this publication.

5.12.3. Prescribed Forms:

5.12.3.1. Forms or IMTs Adopted. AF IMT 847, **Recommendation for Change of Publication**.

5.12.3.2. IMTs Prescribed. AF IMT 673, **Request to Issue Publication**, and AF IMT 1382, *Request for Review of Publications and/or Forms*.

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

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Abbreviations and Acronyms

A/A—air-to-air

AAR—Air-to-Air Refueling

ABM—air battle manager

ACBT—air combat training

ACC—Air Combat Command

ACM— airspace control measure

ACA—airspace coordination area

ACO—airspace control order

ACT—air combat tactics

ADS—air defense sector

AETC—Air Education and Training Command

AFRC—Air Force Reserve Command

AFSOC—Air Force Special Operations Command

AGL—above ground level

AGTS—aerial gunnery target system

AI—air interdiction or air intercept

AIM—air intercept missile

ALEP—aircrew laser eye protection

ALO—air liaison officer

AMC—airborne mission commander or Air Mobility Command

AMWC—Air Mobility Warfare Center

ANG—Air National Guard

AOA—angle of attack

AOB—air order of battle

AOC—air and space operations center

AOD—air operations directive

AOR—area of responsibility

ARCP—AAR control point

ARCT—AAR control time

ARM—anti-radiation missile

ATC—air traffic control

ATO—air tasking order (FRAG)

ATP—Advanced Targeting Pod

AWACS—Airborne Warning and Control System

AWO—air weapons officer

BFM—basic fighter maneuvers

BHM—basic helicopter maneuvers

BMC—basic mission capable

BP—battle position

BRAA—bearing, range, altitude and aspect of target

BVR—beyond visual range

CAF—combat air forces

CAS—close air support

CCA—command and control agency

CCRP—continuously computed release point

CFT—composite force training

CMR—combat mission ready

COMSEC—communications security

CP—control point

CSAR—combat search and rescue

CT—continuation training

CWDS—Conventional Weapons Delivery Software

DACT—dissimilar air combat tactics

DART—deployable aerial reflective target

DCA—defensive counter air

DF—direction finding

DLO—desired learning objective

EA—electronic attack

EEI—essential elements of information

EMCON—emission control (EMCON 1 – Normal Comm, EMCON 2 – Restricted Comm, EMCON 3 – Comm Out, EMCON 4 – Emission Out)

EP—electronic protection

EOB—electronic order of battle

FAA—Federal Aviation Administration

FAC (A)—forward air controller-airborne

FAM—familiarization

FEBA—forward edge of the battle area

FLIP—flight information publication

FLIR—forward looking infrared

FLOT—forward line of own troops

FRA—first run attack

FTS—fighter training squadron

FTU—formal training unit

G—gravity

GCI—ground controlled intercept

GLO—ground liaison officer

GPS—Global Positioning System

HI—high illumination

HUD—head-up display

IAM—inertial aided munitions

ICAO—International Civil Aviation Organization

IFF—identification, friend or foe/initial fighter fundamentals

IFR—instrument flight rules

IG—Inspector General

IMC—instrument meteorological conditions

IMT—information management tool

INS—inertial navigation system

IP—initial point

IQT—initial qualification training

IR—infrared

ISR—intelligence, surveillance, and reconnaissance

JAAT—joint air attack team

JOA—joint operations area

JSOA—joint special operations area

JSTARS—E-8, Joint Surveillance Target Attack Radar System

JTAC—joint terminal attack controller

KIAS—knots indicated airspeed

KIO—knock-it-off

KM—kilometer

LAHD—low angle high drag

LANTIRN—Low-Altitude Navigation and Targeting Infrared for Night

LAS—low angle strafe

LATN—low altitude tactical navigation

LI—low illumination

LOS—line-of-sight

LRS—long range strafe

LTD—laser target designator

MAAP—master air attack plan

MAF—mobility air force

MAJCOM—major command

MC—mission capable

MDS—mission designation series

MOA—military operations area

MQT—mission qualification training

MR—mission ready

MSA—minimum safe altitude

MSL—mean sea level

MTI—moving target indicator

MTR—military training route

MTS—Multi-spectral Targeting System (MQ-1, MQ-9)

NAI—named area of interest

NAF—numbered air force

NFA—no-fire area

NM—nautical mile

NORAD—North American Aerospace Defense Command

NVG—night vision goggles

OCA/ESC—offensive counter air/escort

OPLAN—operation plan

OPORD—operation order

OPSEC—operations security

OSC—on scene commander

OT&E—operational test and evaluation

PACAF—Pacific Air Forces

POM—plane of motion

PTC—positive target control

PR—personnel recovery

RCO—range control officer

RMC—rescue mission commander

ROA—remotely operated aircraft

ROCC—range operations control center

ROE—rules of engagement

RPA—remotely piloted aircraft (Formerly known as UAV or RPV)

RTO—range training officer

RWR—radar warning receiver

SA—surface attack; situational awareness

SAG—surface action group

SALT—size, activity, location, time

SAM—surface-to-air missile

SAR— synthetic aperture radar

SAT—surface attack tactics

SCP—set clearance plane

SEAD—suppression of enemy air defenses

SIF—selective identification feature

SMS—stores management system

SOCC—strategic operations control center

SOF—supervisor of flying

SPINS—special instructions

STV—steerable television

TA—training area; terrain avoidance

TAC—terminal attack controller

TACP—tactical air control party

TACS—theater air control system

TADIL-J——Tactical Digital Information Link – Joint

TAI—target areas of interest

TI—tactical intercepts

TF—terrain following

TFR—terrain following radar

TGP—targeting pod

TO—technical order

TOD—time of day

TOT—time on target

TR—training rule

TRP—terrain reference point

TTS—two target strafe

TTT—time to target

UAV—unmanned aerial vehicle

USAFE—United States Air Force Europe

USAFWS—USAF Weapons School

UTM—Universal Transverse Mercator

VECP SD—value engineering change proposal smokey devil

VFR—visual flight rules

VID—visual identification

VMC—visual meteorological conditions

WD—weapons director

WDZ— Weapon Danger Zone

WG/CC—wing commander

WIC—weapons instructor course

WP—white phosphorous

WSEP—Weapons System Evaluation Program

Terms

1 v 1 v 1 BFM Exercises—Visual setups in which 3 or more separate roles/sides are engaged in visual maneuvering at one time.

Adversary—An aircrew or aircraft flying as an opponent during Air-to-Air training.

Air Combat Tactics—Training in the application of BFM and ACM skills to achieve a tactical Air-to-Air objective.

Air Combat Training—A general term that includes (D)BFM, (D)ACM, and (D)ACT.

Air Refueling Track— (Deleted).

Aspect Angle—The angle between the longitudinal axis of the target (projected rearward) and the line of sight to the interceptor measured from the tail of the target.

Attacker—Air-to-Air: An aircraft simulating carrying Air-to-Air ordnance engaged in offensive maneuvering. Air-to-Surface: An aircraft in the process of delivering Air-to-Surface ordnance.

Attack Restriction—Ingress, ordnance delivery, or egress restrictions depending on situation, (such as, threats, weather, terrain, rules of engagement, etc.)

Autonomous—Aircrew is operating without benefit of information or guidance from a controlling Agency.

Bandit—A positive identification of enemy aircraft. The term is a function of identification and does not necessarily imply direction or authority to engage.

Basic Fighter Maneuvers—Training designed to apply aircraft handling skills to gain proficiency in recognizing and solving range, closure, aspect, angle off, and turning room problems in relation to another aircraft to either attain a position to employ weapons, deny the adversary a position to employ weapons, or defeat weapons employed by an adversary.

Bingo Fuel—A prebriefed fuel state that allows the aircraft to return to the base of intended landing or alternate, if required, using preplanned recovery parameters and arriving with normal recovery fuel.

Bogey—A radar or visual contact whose identity is unknown.

Bogey Dope—A request for target information as requested or closest group in BRAA (with appropriate fill-ins).

Bomber—Any "B" designated aircraft (B-1, B-2, or B-52).

Brevity Words—Succinct phrases or individual words used to convey a more complex message in a tactical environment. AFTTP 3-1.1 and AFTTP(I)3-2.5, contain additional brevity code words.

Cell—Two or more tankers flying in formation.

Class A Range—A manned range as defined in AFI 13-212, Volume 1 Range Planning and Operations, where a range control officer is present with two-way radio voice communication capability.

Class B Range—A manned or unmanned range with scoring capability, but no range control officer.

Class C Range—An unmanned range with no scoring or control capability.

Close Air Support—Air action by fixed- and rotary-wing aircraft against hostile targets that are in close proximity to friendly forces and that require detailed integration of each air mission with the fire and movement of those forces. Also called CAS. (JP 1-02)

Closure—Relative velocity of one aircraft in relation to another. Comm

Jam/Jamming—Attempt to interrupt communication.

Commit—Directive call to intercept a group of interest.

Composite Force—Multiple flights of the same or different MDS aircraft, each under the direction of its own flight leader performing the same or different roles.

Defender—Any type of aircraft attempting to defeat or deny an adversary's weapons employment.

Defensive Maneuvering—Maneuvers designed to negate the attack or ordnance of a maneuvering adversary, surface or airborne.

Electronic Attack—That division of electronic warfare involving the use of electromagnetic or directed energy to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability. Also includes: 1) actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum, such as jamming and electromagnetic deception, and 2) employment of weapons that use either electromagnetic or directed energy as their primary destructive mechanism (lasers, radio frequency weapons, particle beams).

Electronic Warfare—Any military action involving the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the enemy.

Element—A flight of two aircraft.

Element Pop-up—A two ship pop-up attack where the wingman's only reference is the flight lead.

Emergency Rendezvous—Used in the event an aircraft experiences an in-flight emergency. Normally a Point Parallel rendezvous is used to accommodate the emergency aircraft, although a receiver turn-on or a modified short set up rendezvous ("150-30" and the "90-90") may also be used.

Engaged/Engagement—Informative call used to establish engaged and support roles in visual arena. Maneuvers by one or more opposing aircraft attempting to achieve or prevent weapons firing positions.

Flag Exercises—Red Flag, Maple Flag, etc.

Frag—Air tasking order.

Friendly—A positively identified friendly aircraft or ground position.

Forward Air Controller—An officer (aviator/pilot) member of the tactical air control party who, from forward ground or airborne position, controls aircraft in close air support of ground troops. Also called FAC. (JP 1-02)

Forward Air Controller (Airborne)—A specifically trained and qualified aviation officer who exercises control from the air of aircraft engaged in close air support of ground troops. The forward air controller (airborne) is normally an airborne extension of the tactical air control party. Also called FAC(A). (JP 1-02)

Ground EA Environment Exercise—An exercise in which fighter activity combines with countering ground based EW/GCI, acquisition, or communications.

Hard Target—Any target, moving or fixed, with armored/physical protection requiring increased precision/weapons yield.

High Angle Snap Shot Gun Exercise—A gun shot made with a high track-crossing angle, normally attempted because a tracking shot was not possible or desired.

High Illumination—A minimum of 2.2 millilux illumination derived from natural or artificial sources (unless defined otherwise in aircraft specific AFI 11-2MDS series instructions).

Hostile—A contact positively identified as enemy upon which clearance to fire is authorized in accordance with theater rules of engagement.

Hung Ordnance—Any item attached to the aircraft for the purpose of dropping or firing which has malfunctioned or failed to release. In addition, hung ordnance includes the following items: (1) External fuel tanks after unsuccessful jettison attempt; (2) Remaining ordnance after an inadvertent release; (3) 20/30 mm ammunition after a gun malfunction (no fire, unplanned cease fire, runaway gun, or gun unsafe indication); (4) Any stores determined to be in an unsafe condition.

Initial Trainer Aircraft—AETC aircraft used for initial flight training (T-37, T-1A, T-38, and T-43).

Intercept—The phase of an Air-to-Air mission between the commit and the engagement when the fighter executes a series of maneuvers using ground controlled intercept, Airborne Warning and Control System, on board systems, or dead reckoning, to place the aircraft or flight in a position to employ Air-to-Air ordnance, make a visual identification, or initiate a visual engagement.

Inadvertent Release—Uncommanded fired or dropped ordnance. If commanding a single release, do not consider a double bomb release as an inadvertent release if the releases occur from a practice bomb dispenser.

Inert Ordnance—Ordnance with no explosive or incendiary material (Includes BDU-50).

Jettison—The selective release of stores from an aircraft for other than a normal attack.

Joint Live Fire—Defined CAS or FAC(A) sorties flown in support of maneuver units that involve aircraft dropping, firing, and/or expending objects/projectiles. These exercises will involve members of more than one service.

Joint Terminal Attack Controller—A qualified (certified) service member who, from a forward position, directs the action of combat aircraft engaged in close air support and other offensive air operations. A qualified and current joint terminal attack controller will be recognized across the Department of Defense as capable and authorized to perform terminal attack control. Also called JTAC. (JP 1-02)

Joker Fuel—A prebriefed fuel state that requires a transition in the phase of flight (i.e., depart the working area for Air-to-Air refueling) or prepare for RTB.

Judy—The aircrew has radar or visual contact on the correct target, has taken control of the intercept, and only requires situational awareness information; ABMs/WDs will minimize radio transmission. Can be specified for only a portion of the information (Judy angles) or a portion of the scenario.

Knock-It-Off (KIO)—Procedures used to cease tactical maneuvering when safety of flight is a factor, where doubt or confusion exists, or desired learning objectives are met for an entire scenario.

Large Force Exercise—Training where more than 10 aircraft are operating in the assigned airspace.

Live Ordnance—Combat type ordnance incorporating explosive or incendiary material. Do not consider self-protection flares, night illumination flares and spotting charges as live ordnance.

Lost Link (RPA)—Aircraft is no longer under the control of a ground station pilot. Pre-programmed flight profile a RPA flies when Lost Link occurs. Below 5,000 feet AGL or as defined by MAJCOM.

Low Altitude Air Refueling (LAAR)— (Deleted).

Low Altitude Tactical Navigation—Low altitude training using the fundamental aspects of dead reckoning and point-to-point low altitude navigation, with or without prior route planning.

Low-Altitude Training—Mission oriented operations in the low block altitude.

Lowdown—A request to provide tactical ground information pertinent to the mission in a digital bullseye format

Low Illumination—Less than 2.2. millilux (unless defined otherwise in aircraft specific AFI 11-2MDS series instructions).

Minimum Safe Altitude—The defined altitude that provides 1,000 feet of clearance above the highest obstacle/terrain feature (rounded to the next highest 100 feet) within 5 nm of the planned course, routed boundaries, or operations area.

Minimum Risk/Safe Passage—Usually defined in a theater Air Control Order to aid in the safe return of a friendly aircraft that is unable to communicate and/or cannot verify the working status of its IFF/SIF transponder.

Mixed Force—The employment of a single flight of different MDS aircraft, performing the same tactical role, under the direction of a single flight leader.

Mutual Support—That support which units render each other against an enemy, because of their assigned tasks, their position relative to each other and to the enemy, and their inherent capabilities.

Night—The time between the end of evening civil twilight and the beginning of morning civil twilight as published in the American Air Almanac, converted to local time.

Offensive Maneuvering—Maneuvers against an opponent to achieve weapons parameters.

Overwater Range—Range complex in which water immediately surrounds the target or desired mean point of impact and does not have sufficient land references to aid in determining the horizon during attack and safe escape maneuver.

Picture—A request to provide tactical air information pertinent to the mission in a digital bullseye format.

Playtime—Amount of time aircraft can remain on station.

Point Parallel Rendezvous— (Deleted).

Practice Ordnance—Ordnance specifically designed or modified for practice. BDU-33, BDU-38, BDU-48, MK-106, TGLM, ATM, CATM, PTM, and classify ball (or tracer - TPT) gun ammunition as practice ordnance.

Receiver Turn-On/Tactical Rendezvous— (Deleted).

Release—In air armament, the intentional separation of a free-fall aircraft store, from its suspension equipment, for purposes of employment of the store.

Rules of Engagement (ROE)—Directives issued by competent military authority that delineate the circumstances and limitations under which US forces will initiate and/or continue combat engagement with other forces encountered.

Situational Awareness (SA)—The level the warfighter/aircrew is able to recognize, process, and react to both external and internal factors in a dynamic environment to increase lethality, survivability, and mission effectiveness.

Skip It—Veto of fighter commit call, usually followed with further directions. In air intercepts, a term meaning, "Do not attack," "Cease attack," "Cease interception."

Sour—Invalid /no response to an administrative IFF/SIF check. Opposite of Sweet.

Special Instructions (SPINS)—Restrictions, procedures, and scenario elements applicable to specific scenarios, missions, or exercise.

Sweet—Valid response to an administrative IFF/SIF check request. Opposite of Sour.

Tactical Formation—Formations, as defined by AFTTP 3-1 and AFTTP 3-3, that provides mutual support.

Tanker—Any "KC" designated aircraft (e.g., KC-10, KC-135).

Target—A directive call to assign group responsibility. Area on a range complex where the desired mean point of impact is located.

Terminate—Procedures used when safety of flight is not a factor and to indicate stopping ownship maneuvering.

Training Ordnance—Ordnance used in conduct of training. This includes practice ordnance, in ordnance and live ordnance.

Training Rules (TR)—Peacetime rules, procedures, and standards governing Air-to-Air and Air-to-Surface training that, when violated, jeopardize flight safety.

Unexpended Ordnance—Ordnance that is still onboard because no release was attempted.

Unintentional Release—Ordnance fired or dropped through pilot error.

Attachment 2

GENERAL COORDINATION AND BRIEFING GUIDE

(Use for Face-to-Face, Telephonic, or In-Flight Coordination)

A2.1. Date/Time

A2.2. Participants:

A2.2.1. Units

A2.2.2. Contact Phone Numbers and Frequencies

A2.2.3. Number and Type Aircraft

A2.2.4. Call Signs

A2.3. Mission Commander / Deputy Mission Commander

A2.4. Airspace:

A2.4.1. Scheduled Times

A2.4.2. Routing and Entry/Exit points

A2.4.3. Horizontal Boundaries

A2.4.4. Vertical Limits

A2.4.5. Minimum Safe Altitudes (MSA)

A2.4.6. Restrictions and Clearances (EA, EP, Chaff, Flare, Laser, and Ordnance)

A2.4.7. Controlling Agencies.

A2.4.8. Emergency Bases

A2.4.9. Weather

A2.5. Scenario SPINS:

A2.5.1. Objectives (Scenario, Mission, and Training).

A2.5.2. Situation, State, and Stage of Alert.

A2.5.3. Type Aircraft Simulated

A2.5.4. Specify Ordnance Simulated, Live or Inerts (Number and Type)

A2.5.5. Roles and Tactical Objectives

A2.5.6. Performance and Avionics Constraints

A2.5.7. Tactics Constraints

A2.5.8. Maneuvering Limits (Maneuvering Categories, Aircraft Maneuvering Limits)

A2.5.9. Points, Target Locations, Kill Boxes, Defended Areas, Home bases

A2.5.10. Surface Threats, FEBA, Safe Areas

A2.5.11. Vulnerability Times

A2.5.12. ROE (Hostile Acts, ID Criteria, Employment Constraints)

A2.5.13. Valid Shot Parameters

A2.5.14. Kill Criteria

A2.5.15. Shot and Kill Passage

A2.5.16. Kill Removal

A2.5.17. Type/Level of GCI or AWACS Control

A2.5.18. Squawks

A2.5.19. Blocks

A2.5.20. B/E, SARDOT locations

A2.6. Communication Plan:

A2.6.1. Frequencies, Have Quick, Secure, Chattermark, and Code Words

A2.6.2. LINKS/JTIDS/FDL: Table, Crypto, Time, NTR, Fighter Channel, Mission Channel, JU#, and Track Blocks.

A2.6.3. Link Comm vs. Non-Link Comm

A2.7. Rendezvous Procedures (Location, Altitude, Time, Method)

A2.8. Training Rules (If Nonstandard)

A2.9. Mission Contingencies:

A2.9.1. Aircraft Fallout/Minimum Participants

A2.9.2. Single Frequency

A2.9.3. Single GCI/AWACS Scope, Degraded Radar (J-STARS)

A2.9.4. No GCI/ AWACS or JSTARS

A2.9.5. Weather

A2.9.6. Alternate Missions

A2.10. Recovery and Dissimilar Formation Procedures

A2.11. Emergency Procedures

A2.12. Special Subjects

A2.13. Debriefing (Time and Place)

A2.14. GCI/AWACS Coordination

A2.14.1. CAP points/Strike Routes/Timing/Target Locations

A2.14.2. Commit Criteria/Authority

A2.14.3. Tactics (Blue/Adversary)

A2.14.4. Tactical Ranges/Contracts/Application

A2.14.5. Communications (voice/data link)

A2.14.6. Lean/Spin Criteria/Authority

A2.14.7. Reattack Options/TOT Window

A2.15. Joint Stars Coordination

A2.15.1. On-Station Times

A2.15.2. EA/EP Considerations

A2.15.3. Aircraft Capabilities

A2.15.4. Communications:

A2.15.4.1. Lowdown

A2.15.4.2. Target Briefing (9-Line/Details)

A2.15.4.3. Target Talk-Ons

A2.15.4.4. Route Screening

A2.15.4.5. Threat/Target Updates

A2.15.4.6. BDA Passing

A2.16. RPA Coordination

A2.16.1. Target Briefing (9-Line/Details)

A2.16.2. Target Talk-Ons

A2.16.3. BDA Passing

A2.16.4. RPA Lost Link

A2.16.4.1. RPA Lost Link Mission and Altitudes

A2.16.4.2. Assistance Required

A2.16.4.3. Lost Comm procedures

Attachment 3

CAS COORDINATION AND BRIEFING GUIDE

(Use for Face-to-Face or Telephonic Coordination)

A3.1. Participants:

A3.1.1. Units (Flying, Ground/Naval, Units Supported)

A3.1.2. Aircraft Types

A3.1.3. Call Signs/Mission Number/Ordnance/Playtime

A3.2. Weather:

A3.2.1. Forecast / Local Observation

A3.2.2. Sunrise/Sunset/ Moon Illum/Lux data

A3.2.3. Weather Minimums

A3.3. Working / Training Area:

A3.3.1. Airspace / Vul Times

A3.3.2. Airspace Boundaries / Altitudes

A3.3.3. Terrain Features (TRPs, NAIs, TAIs, etc.)

A3.3.4. Ground Obstructions / Hazards

A3.3.5. Entry Points, Exit Points, and Routing

A3.3.6. CPs, IPs, Hold Points, Ingress/Egress Routes

A3.3.7. Approved Targets and Ordnance

A3.3.8. Airspace Restrictions (Noise Sensitive Areas, No-Fly Areas, etc.)

A3.3.9. Established Control Measures (ACAs, NFAs, etc.)

A3.3.10. Rotary-wing Area(s) of Operation

A3.3.11. Aircraft Lighting

A3.4. Scenario:

A3.4.1. Mission and Training Objectives

A3.4.2. Ground Order of Battle

A3.4.2.1. FEBA / FLOT / FSCL

A3.4.2.2. Unit Boundaries / Phase Lines

A3.4.2.3. Threats / Opposing Forces / Regeneration Points

A3.4.2.4. Target Priorities / Types

A3.4.2.5. Artillery Locations / Planned Fires

A3.4.2.6. Friendly Locations / Planned Movements / Planned Fires

A3.5. SPINS/Comm Plan

A3.5.1. ROE (ID Requirements, Employment Constraints, etc.)

A3.5.2. Controlling Agencies

A3.5.3. Enroute / Coordination / Strike Frequencies

A3.5.4. Base Numbers / Code Words

A3.5.5. Authentication Procedures

A3.5.6. HaveQuick and Secure Comm Procedures

A3.5.7. **A3.5.6.** LINKS/JTIDS/FDL: Table, Crypto, Time, NTR, Fighter Channel, Mission Channel, JU#, and Track Blocks

A3.5.8. Map Datum

A3.6. CAS Briefing:

A3.6.1. Check-In Briefing (IAW JP 3-09.3)

A3.6.2. Nine-Line or Call For Fire Briefing (IAW JP 3-09.3)

A3.6.3. Expected Type of Control (Type I / II / III)

A3.6.4. In Flight Report Briefing (IAW JP 3-09.3)

A3.6.5. Aircraft Deconfliction (Altitude / Lateral / Timing Separation)

A3.6.6. Ordnance / Weapons Data

A3.6.6.1. Type and Fuzing

A3.6.6.2. IAM Procedures

A3.6.6.3. Min Safe Distances (for personnel IAW **paragraph 5.1.1.7.** and **Attachment 6**)

A3.6.7. Target Marking

A3.6.7.1. Tactics

A3.6.7.2. Type

A3.6.7.3. Comm Procedures and Brevity Terms

A3.6.7.4. Laser Safety Cone

A3.6.8. Friendly Marking

A3.6.8.1. Type (LCP / Panel / Mirror / Pyrotechnics / etc.)

A3.6.8.2. Comm Procedures and Brevity Terms

A3.6.9. Attack Tactics

A3.6.9.1. Planned Deliveries

A3.6.9.2. Planned Timing Attack Spacing and Re-attacks

A3.6.9.3. Abort Criteria and Procedures

A3.6.9.4. Review "Troops in Contact" and "Danger Close" Calls (peacetime safety criteria will not be compromised)

A3.7. Training Rules

A3.7.1. Knock-it-off / Terminate Criteria

A3.7.2. Live Ordnance Procedures

A3.8. Contingencies:

A3.8.1. Alternate Missions / Targets

A3.8.2. Adverse Weather

A3.8.3. Emergencies

A3.8.3.1. Hung Ordnance/ Unintentional / Inadvertent Release

A3.8.3.2. Jettison Procedures / Areas

A3.8.3.3. Runaway Gun

A3.8.3.4. Radio Failure / No Contact

A3.8.3.5. Controlled Bailout Area

A3.8.3.6. Search and Rescue Procedures

A3.8.3.7. MEDEVAC

A3.9. Debriefing

A3.9.1. Mission and Training Objectives

A3.9.2. Mission Execution and Tactics

A3.9.3. Lessons Learned

Attachment 4

AIR-TO-GROUND JOINT LIVE FIRE PROCEDURES

A4.1. Joint Live Fire Operations. This attachment outlines procedures pertinent to the execution of Joint Live Fire operations. For the purpose of this attachment, Joint Live Fire is defined below. These procedures will be applied in addition to the procedures outlined in **Chapter 5**. Joint Publication 3-09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support*, AFTTP 3-1, Volume 26, *Theater Air Control System*, and AFTTP(I) 3-2.6, J-FIRE, *Multi-service Procedures for the Joint Application of Fire- power* provide further guidance.

A4.1.1. **General.**

A4.1.1.1. Joint Live Fire. Defined as CAS/JAAT or FAC(A) sorties flown in support of ground or rotary wing maneuver units that involve aircraft dropping, firing, and/or expending objects/projectiles. These exercises will involve members of more than one service.

A4.1.1.2. This attachment does not apply to aircraft under the control of a FAC(A)/JTAC supporting exercises involving ground or rotary wing aviation units firing from fixed positions into an impact area with no other maneuver units involved.

A4.1.1.3. This attachment also does not apply to aircraft flying under the control of a FAC(A)/ JTAC from the same or different service if there are no maneuver units involved.

A4.1.2. **Mission Preparation.**

A4.1.2.1. Detailed planning for Joint Live Fire exercises will be accomplished by the common higher headquarters of all the participating units.

A4.1.2.1.1. The Air Force representative, e.g. Aircrew, FAC(A)/JTAC/ALO, will ensure that this planning is consistent with applicable Air Force instructions and conforms to current Joint/Air Force doctrine. The senior aircrew/FAC(A)/JTAC/ALO will also be responsible for maintaining a high state of situational awareness on the locations of all ground troop positions/ movements involved in the exercise.

A4.1.2.2. Aircrew/FAC(A)/JTAC/ALOs will be prepared to shift to alternate targets or abort ordnance delivery if troop location is uncertain or troop movement is within minimum safe separation distance from targets.

A4.1.2.3. All aircrew will receive a comprehensive briefing on the training area. This briefing will include, but is not limited to the following:

A4.1.2.3.1. Expected target location.

A4.1.2.3.2. Location and planned movement of troops and aircraft.

A4.1.2.3.3. Approved alternate target locations.

A4.1.2.3.4. Planned ground fire.

A4.1.2.3.5. Airspace control measures (phase lines, restricted fire areas, etc.).

A4.1.2.3.6. Abort procedures.

A4.1.2.3.7. Emergency jettison procedures and areas.

A4.1.2.3.8. Range restrictions.

A4.1.2.3.9. Exercise operating procedures.

A4.1.2.4. If assigned, units will use their Ground Liaison Officers (GLOs) in their mission briefings to provide service training objectives and tactical situation information. Units without GLOs will obtain tactical situation information from the participating service units' JTAC/ALO.

A4.1.2.5. Refer to **Attachment 3**, "CAS Coordination and Briefing Guide".

A4.1.3. **Procedures.**

A4.1.3.1. Aircrew/JTAC/ALO Criteria.

A4.1.3.1.1. Only CMR/BMC mission-ready aircrew/JTAC/ALOs will participate in joint live fire operations. (No MQT Training) (AFSOC CAS platform follow command guidance)

A4.1.3.1.2. Aircrew will be qualified in the weapons delivery events to be flown IAW AFI11-MDS Volume 1.

A4.1.3.2. Minimum Altitudes.

A4.1.3.2.1. Minimum release and recovery altitudes will be IAW **paragraph 5.3.6.**

A4.1.3.2.2. Minimum altitude over troops will be 200 feet AGL, minimum aircrew qualification, local directive minimums, or airspace coordination minimums, whichever is higher.

A4.1.3.3. Communications and Control Procedures.

A4.1.3.3.1. The senior JTAC/ALO will ensure continuous communications are available between all parties involved in the joint live fire. If two-way communication between any party is lost, all ordnance delivery activities will cease until communications are re-established.

A4.1.3.3.2. The JTAC/ALO will coordinate all fires with the appropriate maneuver and fire support unit prior to commencement of an air strike.

A4.1.3.3.3. The FAC(A)/JTAC/ALO will be positioned to ensure the correct target is being attacked and watch for unplanned troop movements beyond planned control measures.

A4.1.3.3.4. If terrain, weather, or other factors restrict the FAC(A)/JTAC/ALOs ability to observe and control the exercise, a safety observer will be required.

A4.1.3.3.4.1. The safety observer will be a FAC(A)/JTAC/ALO with two-way radio communication who is in a position to observe the target. The safety observer maintains full abort authority and will ensure the correct target is attacked while maintaining the safety of ground personnel and equipment.

A4.1.3.3.4.2. If the safety observer is unable to observe the target, an independent safety observer using a maneuver commander approved automated ground and air forces tracking system (e.g., Solaris, AWMDS) with two-way

communication to all players fulfills this requirement.

A4.1.3.3.5. All air strikes will be controlled by a current and qualified FAC(A)/JTAC who has positive radio communications with each aircraft.

A4.1.3.3.5.1. The FAC(A)/JTAC will exercise control IAW JP 3-09.3, *Joint Tactics, Techniques, and Procedures for Close Air Support.*

A4.1.3.4. Troop and target identification is critical. All available means (map plot, aircraft systems, target mark, target talk-on, etc.) will be utilized to positively identify the target and its relation to friendly forces.

A4.1.3.4.1. When within 5 km (3 nm) of friendly ground troops, the target will be marked by a unique terrain feature, laser, or a conspicuous marking device (i.e., white phosphorus rocket, artillery round, smoke grenade, IR pointer, etc.).

A4.1.3.4.2. Each flight member will acknowledge target identification and direction of attack prior to their initial pass on the target.

A4.1.3.4.3. Refer to **paragraph 5.9.** for additional guidance on CAS operations with IAMs.

A4.1.3.4.4. In order to ensure target/impact area recognition, all pilots will accomplish a dry pass using simulated ordnance release parameters prior to the actual expenditure of ordnance. This pass will be under the control of a FAC(A)/JTAC. Exercise rehearsals conducted up to 48 hours in advance may count as the initial pass provided all major participants and parameters remain the same. (N/A for AFSOC).

A4.1.3.4.5. If friendly maneuver forces are within 5 km (3 nm) of the target, the elements closest to the target must be positively identified by the attacking aircraft prior to weapons expenditure.

A4.1.3.5. Air Delivered Ordnance Minimum Safe Distance Criteria. Aircrew and JTACs will ensure the position(s) of friendly forces are deconflicted from weapons footprints before expending IAW **5.1.1.7.**

A4.1.3.5.1. TACP/JTACs operating at the MSDs listed in **Attachment 6** are required to wear protective equipment (including eyewear) IAW **5.8.3.** Ground Maneuver units and other personnel in the vicinity of the target area will adhere to WDZ footprint distances.**5.1.1.7.**

A4.1.3.6. Weather Minimums. Weather minimums for Joint Live Fire operations will be 2,500 feet ceiling, and 5 miles visibility for aircraft employing visual weapons deliveries. For aircraft employing non-visual deliveries, weather minimums will be IAW applicable AFI 11-MDS series instructions.

Attachment 5

AIR-TO-AIR LIVE FIRE PROCEDURES

A5.1. Aerial Gunnery. The following rules apply to missions involving live gun firings against towed targets.

A5.1.1. **General:**

A5.1.1.1. The TRs in this instruction apply with the following additional restrictions:

A5.1.1.1.1. Implement procedures to ensure the range are clear of surface activity and other aircraft before firing over an undercast.

A5.1.1.1.2. Cease fire if sighting any surface activity or other aircraft in the bullet impact area.

A5.1.1.1.3. A Range Control Officer (RCO) must be present during firing. After join-up with the tow aircraft, the engaging flight lead will become the RCO (if qualified). A Tow pilot may perform RCO duties (if qualified) when an RCO flight lead is not present.

A5.1.1.2. The Flight Lead and Tow Pilot will:

A5.1.1.2.1. Ensure firing occurs within the range boundaries.

A5.1.1.2.2. Ensure the range is clear of surface and other airborne traffic at all times during firing.

A5.1.1.2.3. Ensure TR compliance.

A5.1.1.2.4. Assess fouls.

A5.1.1.3. The Tow Pilot will:

A5.1.1.3.1. If chased, make a warning call before deploying the AGTS.

A5.1.1.3.2. Fly the pre-briefed pattern.

A5.1.1.3.3. Initiate radio calls to control the firing sequence.

A5.1.1.3.4. Establish a turn before issuing a "CLEARED TO FIRE" call.

A5.1.1.3.5. Record hits for each pass.

A5.1.1.4. The Shooter will:

A5.1.1.4.1. Monitor the AGTS deployment and notify the tow if any malfunctions occur.

A5.1.1.4.2. Not fly directly below or astern the tow aircraft at any time.

A5.1.1.4.3. Acknowledge all calls from the tow pilot.

A5.1.1.4.4. Maintain safe separation from the target if the shooter air scores the target.

A5.1.1.4.5. Not make firing passes on a target that rolls in a turn, is flying high on the tow, or flying in an erratic manner.

A5.1.1.4.6. Maintain positive overtake and a minimum of 5 degrees angle-off to the inside of the target's turn while engaged.

A5.1.1.4.7. Prepare to avoid target debris that will result from a hit.

A5.1.1.4.8. Immediately after firing, perform a reposition to get out of the target's plane of motion (POM) and avoid a 5-degree cone aft of the target's POM.

A5.1.1.4.9. Visually inspect all shooter aircraft with another aircraft to search for damage at the conclusion of gunnery operations.

A5.1.1.5. If the shooter requires a chase aircraft, the chase will maneuver as necessary to observe the firing distance, effectiveness, and shooter position relative to the gun line of fire. The chase will fly a position to avoid target debris and the shooter during post-fire reposition maneuvers.

A5.1.1.6. Fouls. Assess a foul to the aircrew for any of the following conditions:

A5.1.1.6.1. Firing without a clearance.

A5.1.1.6.2. Firing from outside the turn of the target.

A5.1.1.6.3. Firing within 1,000 feet of the target.

A5.1.1.6.4. Flying within 800 feet of the target.

A5.1.2. **AGTS/BANNER Basic Patterns.** The following section defines various setups available for aerial gunnery training. The pattern selected and the tactics employed should meet the training requirements for the individual unit. Ideally, shooters will engage the aerial target as a two-ship element if two aircraft are available.

A5.1.2.1. Combat Pattern (**Figure A5.1. & Figure A5.2.**):

A5.1.2.1.1. The tow will maintain 300 to 450 KIAS for AGTS and 200-250 KIAS for BANNER. The shooters will perform a two-ship front quarter tactical intercept using AFTTP 3-1 tactics. Prior to the merge, the RCO will call "Arm Hot" and the shooter(s) will arm hot. The altitude separation requirements in **paragraph 4.2.11.** apply.

A5.1.2.1.2. Clearance for the tow ship to maneuver occurs after one of the following is met:

A5.1.2.1.2.1. The tow ship has visual contact with one shooter aft of the tow's 3/9 line.

A5.1.2.1.2.2. The attacking flight leader directs the tow ship to maneuver with a "Merge, Merge" call.

A5.1.2.1.2.3. As briefed by the attacking flight lead.

A5.1.2.1.3. The tow pilot will issue "Cleared to Fire" after establishing the turn.

A5.1.2.1.4. Shooter tactics should include simulated missile employment culminating in a gun attack on the target, using proper radio terminology and attack procedures. Continue attacks until finishing the engagement, time expires, reaching bingo fuel, Winchester, or approaching minimums. At this time, initiate

a “KIO, Arm Safe” call acknowledged by all players. The tow may not roll out of the turn until all players acknowledge the KIO.

A5.1.2.1.5. Each shooter will ensure that the other attacker is clear of the target before shooting. If able, the old attacker should reposition high after firing to avoid conflict with the target and the new shooter's attack.

A5.1.2.2. Butterfly Pattern (**Figure A5.3. & Figure A5.4.**):

A5.1.2.2.1. Begin the setup with the shooter and the tow flying in a co-altitude, line abreast, tactical formation. After the shooter(s) and the tow are ready, the flight lead calls "check away," and the aircraft turn 45 degrees away from each other. For the BANNER, the tow will maintain 200-250 KIAS and check 30 degrees away; the shooters will check away 45 degrees and accelerate.

A5.1.2.2.2. During the turn away, the RCO will call "Arm Hot" and the shooter(s) will arm hot. At the briefed range, the flight lead will call, "Turn in, Fights On." The tow will turn into the shooters and reference 90 degrees off of the original heading. The shooter(s) will maneuver to the merge with 2000 feet of horizontal and vertical separation from the tow until tally both the tow and the target.

A5.1.2.2.3. After the shooter(s) pass the tow's 3/9 position and the tow begins turning, the tow pilot will call, "Cleared to Fire."

A5.1.2.2.4. The tow will maintain a continuous turn into one of the shooters. If there are two shooters, the first shooter will maneuver to a high-angle tracking shot on the AGTS/BANNER and then reposition high and outside of the target flight path. The second shooter will maneuver to a lower aspect gun attack after the first shooter has repositioned clear of the fight. After the second shooter has attempted a gun attack, initiate a "KIO" or continue with sequential attacks.

A5.1.2.3. Perch Pattern (**Figure A5.5.**):

A5.1.2.3.1. Begin the setup with the shooter 6000 feet behind the tow with a radar lock on the AGTS/BANNER (4000 feet radar range) and 10 to 30 degrees of aspect. The wingman will be in spread formation with the flight lead.

A5.1.2.3.2. When all aircraft are ready, the RCO will call “Arm Hot” and shooters will arm hot. The AGTS tow should make a "30 seconds" call indicating that the tow is accelerating to final towing airspeed and a "10 seconds" call will be made indicating that the tow is starting the turn. A "Cleared to fire" call will be made by the tow when established in the turn.

A5.1.2.3.3. Once the setup begins, the fighters will perform sequential attacks against the AGTS/BANNER.

A5.2. Live Missile Firing. This section applies to live missile-firing exercises. Predeployment and deployment briefings will cover specific procedures, requirements, and restrictions.

A5.2.1. **Terms Explained:**

A5.2.1.1. Range Safety Officer. The Range Safety Officer is the individual responsible for monitoring all parameters of operations safety during live-fire missions. The Range Safety Officer normally operates out of Range Control.

A5.2.1.2. Safety Chase. An aircrew member qualified to brief and control live missile firing missions. Acts as mission commander for firings.

A5.2.1.3. AWO/WD. A GCI or AWACS director who provides mission support assistance as dictated by the profile.

A5.2.2. **General.** The TRs of this instruction apply with the following additional restrictions and requirements:

A5.2.2.1.1. Dash-34 Checklist items (ground checks).

A5.2.2.1.2. Pre-range checks.

A5.2.2.1.3. Telemetry procedures.

A5.2.2.1.4. Range procedures.

A5.2.2.1.5. Firing procedures.

A5.2.2.1.6. Launch procedures and parameters.

A5.2.2.1.7. Debris areas and FOD potential.

A5.2.2.1.8. Emergency procedures.

A5.2.2.2. Conduct all missile firings in appropriate Air-to-Air ranges under positive radar control. The safety chase will fly a chase formation position with the firing aircraft (shooter(s)). Safety chase qualified aircrews may act as safety chase for missiles fired from their own aircraft.

A5.2.2.3. Implement procedures to ensure the range is clear of surface activity and other aircraft before firing over an undercast.

A5.2.3. **Arming and Dearming.** Follow locally established arming and dearming procedures for live missile firing missions.

A5.2.4. **Firing Procedures:**

A5.2.4.1. All members of the flight will clear the range area visually and check for surface activity while in the firing pattern (weather permitting).

A5.2.4.2. Members of the flight not engaged in firing will fly a position as directed by the safety chase or GCI or AWACS director. Conduct the flight to preclude any aircraft from entering an area forward of the shooter's 3/9 line within the missile footprint when the Master Arm switch is in an armed position. Immediately safe the aircraft weapons systems anytime another aircraft moves forward of the shooter's 3/9 line within the missile footprint.

A5.2.4.3. Conduct firings to ensure launch, impact, and missile fallout all occur within the range safety footprint.

A5.2.4.4. After firing a missile, the flight will maneuver as necessary to clear possible debris.

A5.2.4.5. Shooters will change positions when cleared by the safety chase.

A5.2.4.6. The safety chase will advise the AWO/WD upon completion of armament safety checks and on clearing the range (if required).

A5.2.4.7. Even if observing a normal missile launch, visually inspect all shooter aircraft with another aircraft to search for damage.

A5.2.5. **Communications.** Exercise strict radio discipline to alleviate the risk of confusing transmissions. Normally only the AWO/WD, safety chase, shooter, or range safety officer will make transmissions. This is not to preclude anyone having knowledge of a dangerous situation from transmitting a KIO, cease fire or other appropriate warnings. Establish voice communications between the firing flight and range control facility before firing. Shooters must acknowledge all radio calls. Along with the radio calls prescribed elsewhere in this instruction, use the following transmissions for Air-to-Air Weapons System Evaluation Program (A/A WSEP) missions:

A5.2.5.1. “CLEARED TO PAIR”: Call transmitted by the safety chase to GCI or AWACS director to indicate that the tactical lead has been given to the shooter.

A5.2.5.2. "COMMIT": Call transmitted by the range safety officer, through GCI or AWACS director, to the shooter to intercept the target. This call allows the safety chase to issue clearance to arm after establishing formation criteria.

A5.2.5.3. "ARM HOT": Call transmitted by the safety chase allowing the shooters to arm weapons systems. Shooters will not place the Master Arm switch to ARM until cleared.

A5.2.5.4. "BANDIT, BANDIT": Call transmitted by the range safety officer, through GCI, to transfer range safety responsibility to the safety chase. The safety chase will clear shooters to fire when appropriate.

A5.2.5.5. "HOSTILE, CLEARED TO FIRE": Call transmitted by the safety chase to the individual shooters after meeting all safety conditions and accomplishing all mandatory radio calls. This is the only transmission that allows shooters to fire their weapons. Clearance to fire is clearance to arm.

A5.2.5.6. "ARM SAFE": Call transmitted by the safety chase or range control facility. This call cancels clearance to fire. Shooters will safe their weapon system but may continue to maneuver to launch parameters.

A5.2.5.7. "CEASE FIRE": Call transmitted by the safety chase or range control facility. This call cancels clearance to fire. Shooter may remain armed and continue to maneuver to launch parameters.

A5.2.5.8. "FOX": Call transmitted by the shooter at weapons launch.

A5.2.5.9. “FOX, FOX”: Call transmitted by the safety chase to confirm missile launch.

A5.2.5.10. "KNOCK IT OFF, ARM SAFE": Call transmitted by the safety chase to terminate the engagement and safe the weapons systems following missile flyout. The

shooter will acknowledge this call, terminate the engagement and safe the weapons systems.

A5.2.6. **Abnormal Procedures:**

A5.2.6.1. If required, missiles will be "safe jettisoned" in the range area according to locally established procedures.

A5.2.6.2. Conduct jettison procedures to ensure both launch and missile fallout occurs within the range boundary.

A5.2.6.3. Hung ordnance and misfire procedures will be according to locally established procedures.

Figure A5.1. Typical AGTS/BANNER Combat Pattern.

Communications for Mongo 1 as
Tow and RCO, Beeman 1&2 as Shooters

B1 - Beeman 1&2 Rdy South
M1 – Mongo 1 Rdy North
B1 – Beeman, Mongo Turn In
(Tow skulls directly at Beeman 1's point)
(Intercept Geometry at Flight Lead Discretion)
*M1 – Beeman 1&2 Arm Hot (Training PACS) / (Check Simulate)
B1 – Beeman 1 Arm Hot (Training PACS) / (Check Simulate)
B2 – Beeman 2 Arm Hot (Training PACS) / (Check Simulate)
M1 – Mongo 1 Tally One/Two
(Tow starts gunnery turn at 3/9 passage if Tally 2 or "Merge, Merge" call from Beeman 1)
B1 – Merge, Merge *(if required)*

M1 - Beeman 1&2 Cleared to Fire
B1 - Beeman 1 Cleared to Fire
B2 - Beeman 2 Cleared to Fire
B2 – Beeman 2's Engaged
B1 – Beeman 2 Press
B2 – Beeman 2 Off Hot/Cold/Dry
B1 – Beeman 1 Engaged Left 4 O'clock Low
(Clearance to fire continues until Cease Fire or Knock It Off, Arm Safe)
(If initial clearance was to "Arm Hot Training PACS" or "Check Simulate", RCO may issue "Arm Hot" for acknowledgement by shooters between attacks)
B2 – Beeman 1 Press
(Sequential Attacks may continue as briefed)
M1 - Beeman 1&2 Knock It Off, Arm Safe
B1 - Beeman 1 Knock It Off, Arm Safe
B2- Beeman 2 Knock It Off, Arm Safe

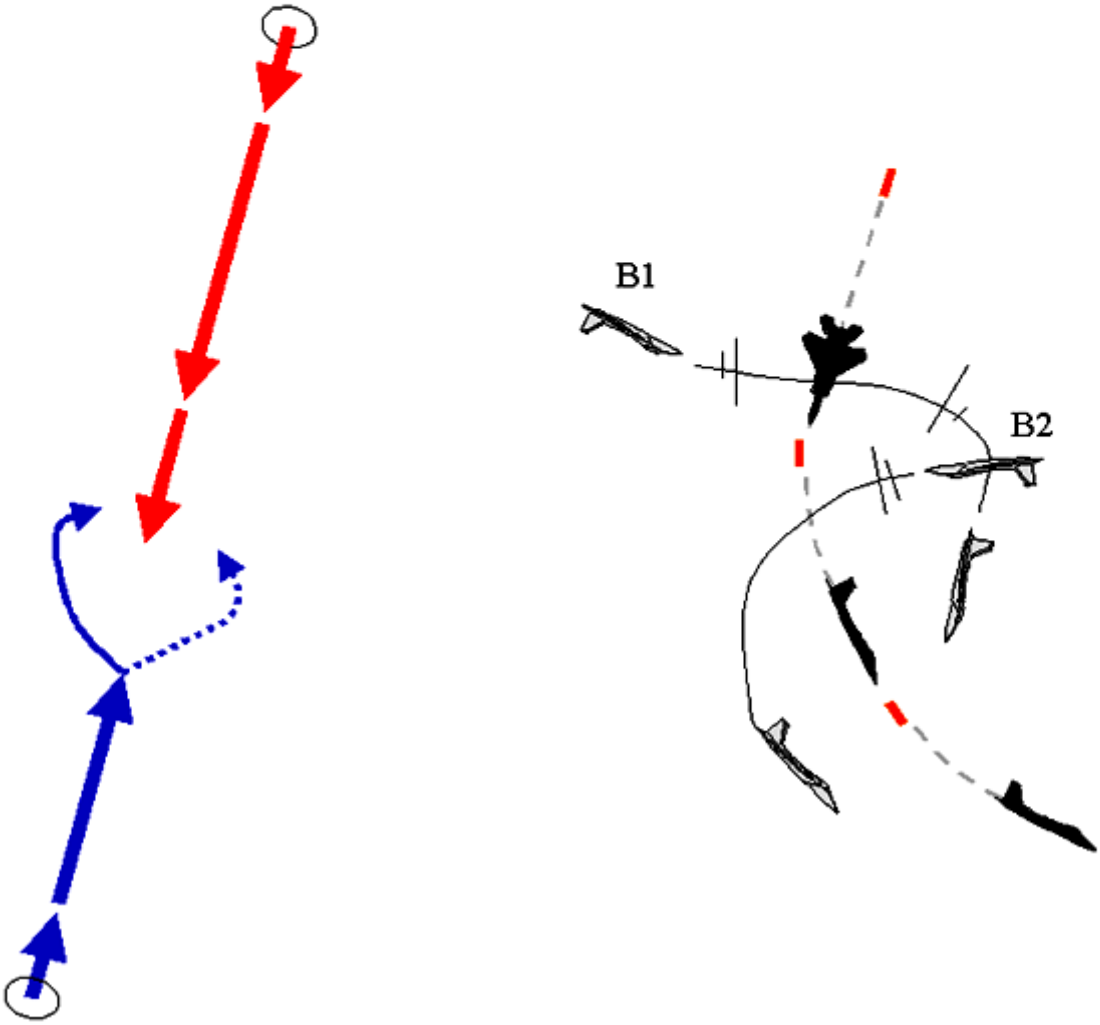
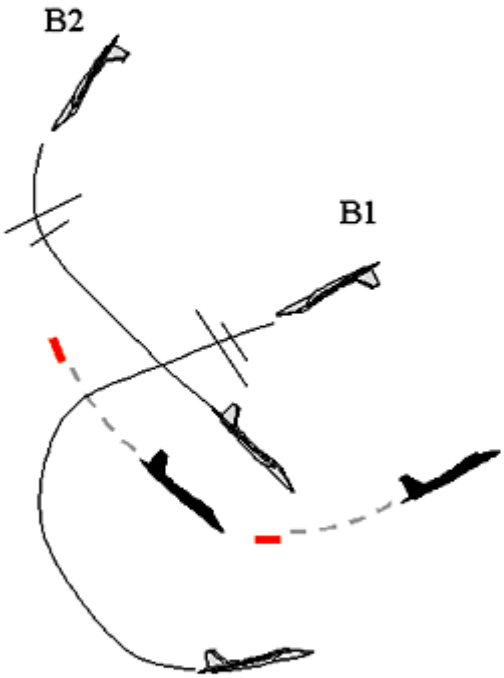


Figure A5.2. Typical AGTS/BANNER Combat Pattern (Continued).

B1- Beeman 1 Off Hot/Cold/Dry
B2 – Beeman 2 Engaged Left 7 O'clock Low
(*Clearance to fire continues until Cease Fire or Knock It Off, Arm Safe*)
(*If initial clearance was to "Arm Hot Training PACS" or "Check Simulate", RCO may issue "Arm Hot" for acknowledgement by shooters between attacks*)
B1 – Beeman 2 Press



B2 – Beeman 2 Off Hot/Cold/Dry
(*Sequential Attacks may continue*)
M1 - Beeman 1&2 Knock It Off, Arm Safe
B1 - Beeman 1 Knock It Off, Arm Safe
B2- Beeman 2 Knock It Off, Arm Safe

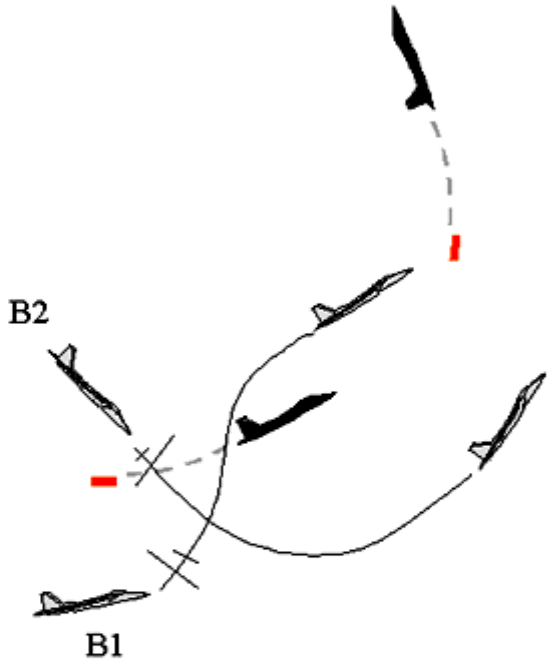
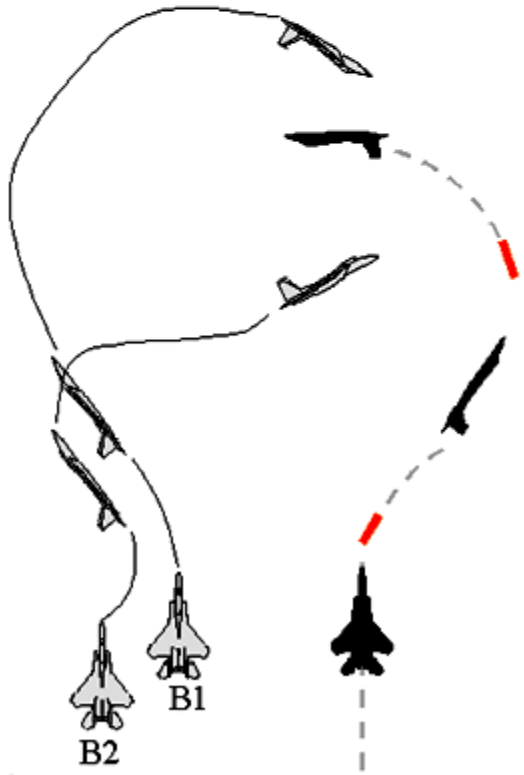


Figure A5.3. Typical AGTS/BANNER Butterfly Pattern.

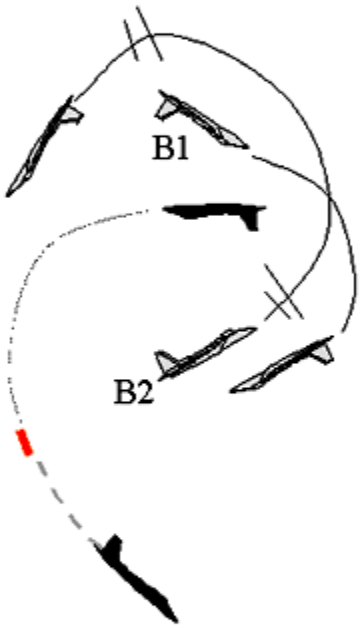
Communications for Mongo 1 as
Tow and RCO, Beeman 1&2 as Shooters

B1 - Beeman 1's Rdy
B2 – Beeman 2's Rdy
B1 – Beeman, Mongo Check Away
(AGTS – All 45°; Banner – Shooters 45°, Tow 30°)
*M1 – Beeman 1&2 Arm Hot (Training PACS) / (Check Simulate)
B1 – Beeman 1 Arm Hot (Training PACS) / (Check Simulate)
B2 – Beeman 2 Arm Hot (Training PACS) / (Check Simulate)
B1 – Turn In
(Tow turns 90° to setup heading)
(Tow starts gunnery turn at 3/9 passage if Tally 2 or "Merge, Merge" call from Beeman 1)
B1 – Merge, Merge (*if required*)
M1 - Beeman 1&2 Cleared to Fire
B1 - Beeman 1 Cleared to Fire
B2 - Beeman 2 Cleared to Fire



Setup:
14-18K Ft
Line Abreast 6-9K
225-300 Kts

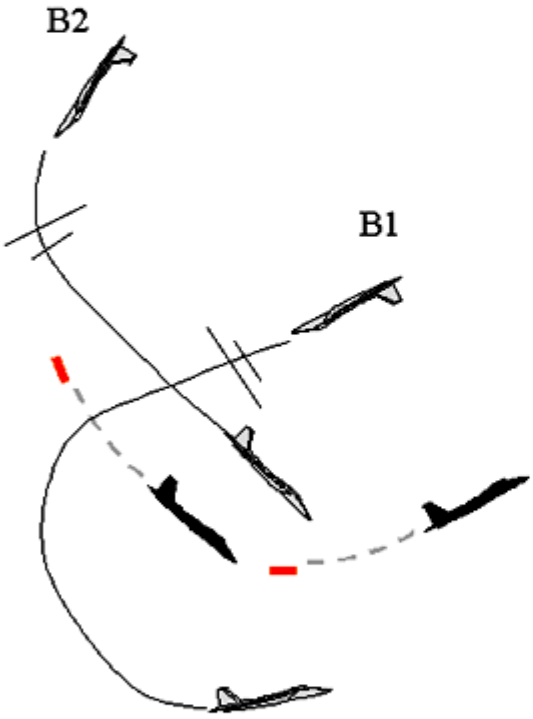
B1 – Beeman 1's Engaged
B2 – Beeman 1 Press



* Banner Tow Pilot will never be the RCO. For Banner operations, Beeman 1 would have to be RCO qualified and would issue the clearance to arm hot

Figure A5.4. Typical AGTS/BANNER Butterfly Pattern (Continued).

B1- Beeman 1 Off Hot/Cold/Dry
B2 – Beeman 2 Engaged Left 7 O'clock Low
(*Clearance to fire continues until Cease Fire or Knock It Off, Arm Safe*)
(*If initial clearance was to "Arm Hot Training PACS" or "Check Simulate", RCO may issue "Arm Hot" for acknowledgement by shooters between attacks*)
B1 – Beeman 2 Press



B2 – Beeman 2 Off Hot/Cold/Dry
(*Sequential Attacks may continue*)
M1 - Beeman 1&2 Knock It Off, Arm Safe
B1 - Beeman 1 Knock It Off, Arm Safe
B2- Beeman 2 Knock It Off, Arm Safe

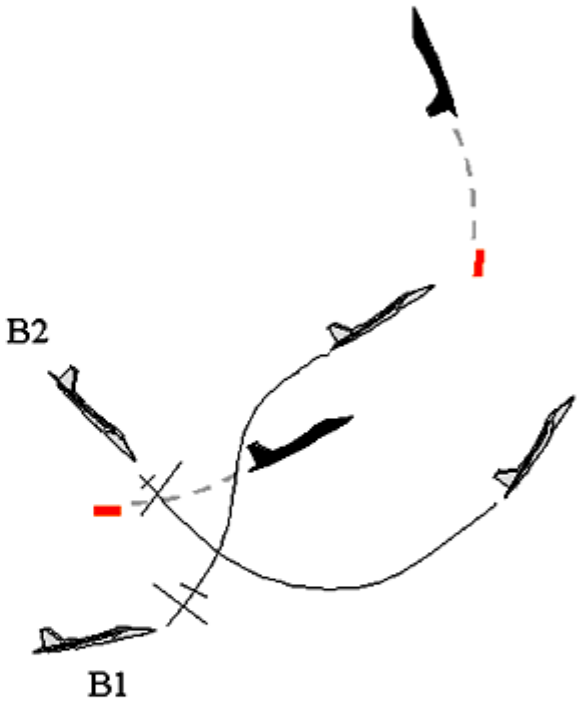
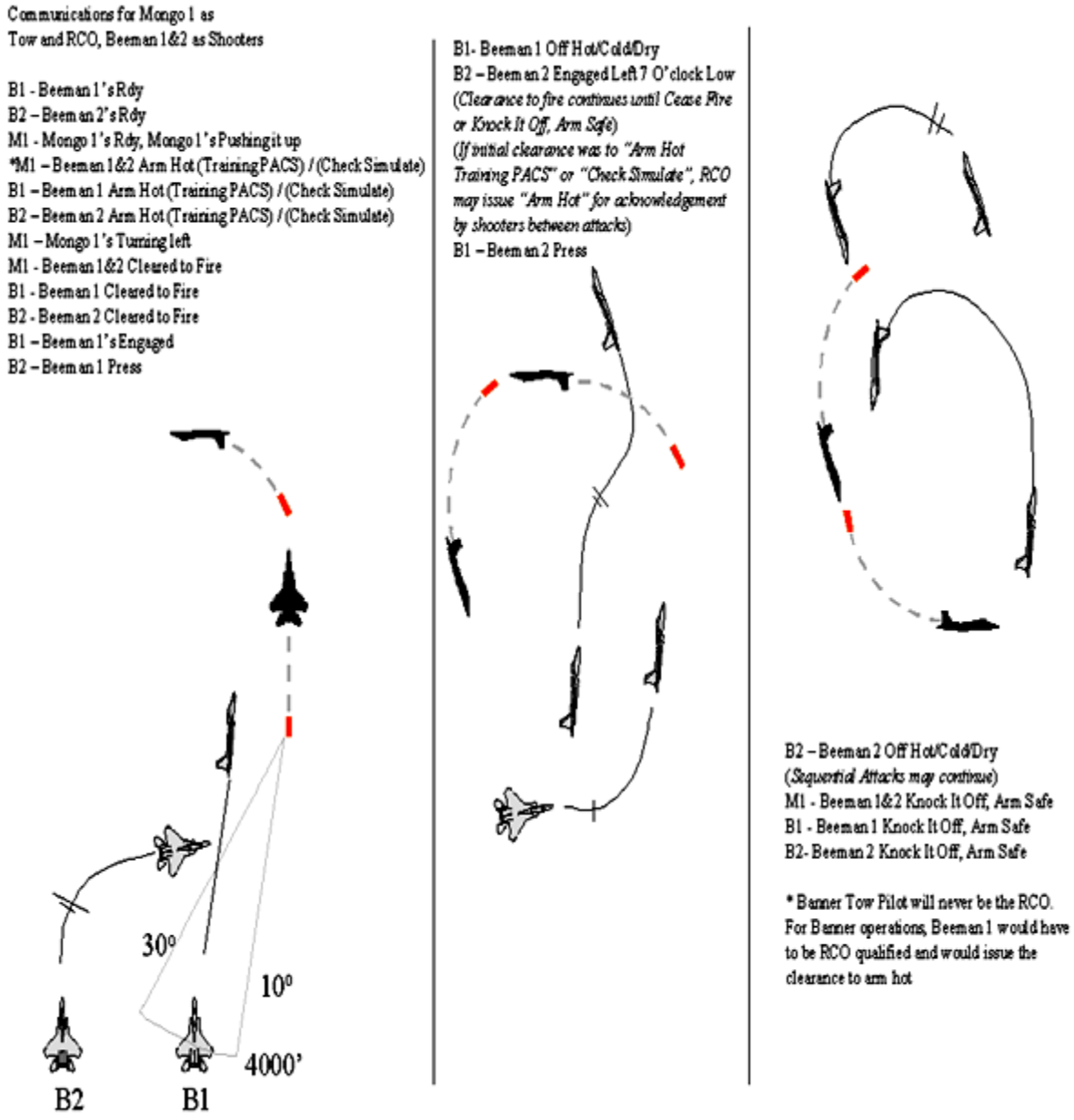


Figure A5.5. Typical AGTS/BANNER Perch Pattern.



Attachment 6

MINIMUM SAFE DISTANCES FOR GROUND PARTIES (LIVE FIRE TRAINING) (MSD-T)

Table A6.1. Minimum Safe Distances for Ground Parties (Live Fire Training) (MSD-T).

Minimum Safe Distances for Ground Parties (Live Fire Training) (MSD-T)				
Weapon		**Min Safe Distance (Meters)**	**Ricochet Fan (Deg/Meters)**	**Specific Remarks (A6.2.x.)**
Ammo	7.62mm	500	All Headings	2
	20mm	500	60/2700	2
	25mm	500	60/2600	2
	25mm PGU-23 TP (AC-130)	500*/400	60/2000	6
	25mm PGU-25 HEI (AC-130)	500*/400		6
	30mm	500	60/2600	2
	40mm AP/APT (AC-130)	500*/300	60/950	6
	40mm PGU-9 HEI (AC-130)	500*/300		6
	105mm PGU-43 TP (AC-130)	650*/400	60/700	6
	105mm PGU-44 HEI (AC-130)	650*/600		6
	105mm PGU-45 HE/HF (AC-130)	650*/600		6
Rockets	2.75” Inert	500	60/1800	2
	2.75” HE or WP	700	60/3100	2
Bombs	MK 82(LD/AIR)	1200		
	M117 (LD/AIR) (750lb)	1800		
	MK 83 (1,000lb)	1000		
	MK 84 (LD/AIR) (2,000lb)	1800		
	GBU-10 (2,000lb LGB)	1800		1, 4, 5
	GBU-12 (500lb LGB)	1000		1, 4, 5
	GBU-31 (2,000lb JDAM)	1800		1, 5
	GBU-38 (500lb JDAM)	1200		1, 5
	CBU-87	1700		3
	AGM-65 (All Models)	1300		1
	MK 82/83/84 Inert	500		
	GBU-10/12 Inert	500		1, 4, 5
	GBU-31/38 Inert	500		1, 5
	BDU-33/38/45/50/56	500		
	MK 76	500		
	LGTR I	500		1, 4
Med Alt Bomber (15-30K AGL) GP				

Weapon		Min Safe Distance (Meters)	Ricochet Fan (Deg/Meters)	Specific Remarks (A6.2.x.)
B-1	MK 82 (Live/Inert)	1200		5
B-1	MK 84 (Live/Inert)	1800		5
B-52	MK 82 (Live/Inert)	2100		5
B-52	MK 84/M117 (Live/Inert)	2400		5

A6.1. GENERAL REMARKS:

A6.1.1. **Applicability.** This attachment establishes minimum distances that ground JTAC/TACP personnel may be safely located in relation to the target/impact area of standard munitions. The area within the limits established by this attachment is designated the danger area. Minimum safe distances are from the target/impact area, and for a ground function only. Additionally, range features can affect weapon impact points, and must be factored into planning (e.g., high terrain short of the intended target may intersect weapon flyout trajectories, causing short impacts). Only the weapons listed may use the distances contained in the table and aircrew will adhere to specific remarks for a weapon if they are listed. Only the following aircraft may utilize the live fire table: A-10, F-16, F-15E, F/A-18, AV-8, AC-130, B-1, B-2, and B-52. JTAC/TACP personnel will wear Service mandated protective gear (including eye protection) when operating at these MSDs IAW **5.8.3.**

A6.1.2. **Parameters Assumptions.** Aircraft attack parameters must be at or below 15,000 feet AGL for level or diving deliveries, and at or below 20,000 feet AGL, 540 KTAS for level LASER guided bombs. For GBU-31/38 munitions from a bomb on coordinate mode, altitude and release airspeeds are limited by range regulation parameters and weapon battery life. B-1, B-2, and B-52 must reference **A6.2.5.** and AC-130 must reference **A6.2.6.**

A6.1.3. **Multiple Deliveries.** Ripple/string/stick deliveries must be less than 500 feet total length, with a maximum of 6 weapons. For inertially-aided munitions (IAMs) deliveries, a 250 foot maximum impact distance from the primary DMPI will be used for all pattern-managed drops.

A6.1.4. **(DELETED)**.

A6.1.5. **Ammo (bullet) numbers.** AC-130 ammo numbers are taken from AFI11-2AC-130v3, reference **A6.2.6.** for specific restrictions. Attack/Fighter ricochet fan numbers are WDZ derived for 20mm and 30mm (extrapolated for 25mm); single drop attack/fighter strafe min safe distance numbers are JMEM-derived.

A6.2. SPECIFIC REMARKS:

A6.2.1. **Guided Weapon Hazard Areas.** Hazard areas for guided weapons (AGM-65, LGB's, JDAM's) are highly dependent upon launch conditions and in some cases coordinate accuracies. Coordinate quality and passage presents a significant risk to ground personnel for coordinate-dependent weapons released in a bomb on coordinate mode--extreme caution must be taken to prevent mishaps. Weapon malfunctions (such as fin failures) are not included, with the assumption that malfunctioning weapons have the same probability of impacting any point within the hazard area.

A6.2.1.1. JTACs may tactically derive coordinates (via MK VII, map/compass, etc.) which must be cross-checked and confirmed using all available means to include target coordinates listed in range supplements, if applicable. Likewise, aircrew may tactically derive coordinates (via Sensors, SAR MAP, etc.) for actual employment with bomb-on coordinate weapons. Prior to actual weapon release, aircrew will adhere to **5.1.1.6.**

A6.2.1.2. Guided weapons distances are not platform-specific. Minimum distances apply to all delivery platforms, however, release parameters must be in accordance with the parameter assumptions detailed in general remarks.

A6.2.2. **Bullet/Rocket Ricochet Fans.** The ricochet fan will be dependent upon many variables, such as bullet/rocket weight and shape, impact angle, speed, etc. Thus, the ricochet fan must be applied to each target so that ground personnel are not within the ricochet fan. The aircraft flight path/ firing direction will bisect the ricochet fan--a 60 degree fan will be drawn 30 degrees right and 30 degrees left of the flight path/firing direction.

A6.2.3. **CBU-87.** Data is for intact canister, and is based on a 209' x 183' pattern size. Delivery assumptions are for 4 canisters or less, 75 feet spacing, 1200 feet HOF, 2000 SPIN. For patterns that exceed these parameters, the Minimum Safe Distance must be expanded to include the larger pattern. Distances indicated must be added to the radius of the calculated bomblet pattern. CBU-87 data is for fighters only, and is restricted to fighter employment only.

A6.2.4. **Environmental Factors for Laser-Guided Weapons.** Data assumes environmental conditions are conducive to seeker/weapon acquisition, and reflected laser energy is sufficient to guide the weapon to the target.

A6.2.5. **Medium Altitude Bombers (B-1, B-2, B-52).**

A6.2.5.1. **Guided Weapons.** Bombers must adhere to **A6.1.2.** and **A6.2.1.** for guided weapons employment. The maximum pattern distance for IAM weapons deliveries using pattern management tactics will not exceed 250 feet from the intended target passed from the JTAC.

A6.2.5.2. **GP Bombs.** Medium altitude bombers conducting aircraft computed MK 82/MK 84/M117 level deliveries are limited to 30,000 feet AGL and below, airspeeds not exceeding 540 KTAS, and maximum stick length of 500 feet and 6 weapons. Weapon releases outside these parameters will not meet weapon accuracies used in the minimum safe distance calculations and should not be employed with this table. The distances listed in the Med Alt Bomber table are for all MK 82/84/M117 live, inert, BDU-50/56 unguided GP releases above 15K AGL. For releases below 15K AGL, and for JDAM and LGB releases up to 30K, bombers may use MSDs listed for those weapons contained in the "Bombs" section of the table. In all cases, bombers must remain below 30K AGL to meet minimum safe distance calculations.

A6.2.5.3. **Cross-wind limits.** A 50 knot direct cross-wind was assumed in the calculations. Weapons should not be delivered using the table numbers when the cross-wind component exceeds 50 knots at release.

A6.2.5.4. B-2 deliveries are restricted to GBU-31/38 only.

A6.2.6. **AC-130 Parameters and Restrictions.** Use the numbers annotated with an asterisk (*) when radar (APQ-180) is the primary fire control sensor. When IR or TV is the primary fire control sensor and the system has been tweaked (min 750m away from friendlies) crews may use the non-asterisk numbers.

A6.2.6.1. **No-Fire Zones.** To mitigate the risk of ricochet with AP/TP ammo, the AC-130 will use no-fire zones if ground party is within: 700m for 105mm TP, 950m for 40mm AP/APT, and 2000m for 25mm TP. No-fire zones are relative to ground party location from target and are based on aircraft heading, not gun-to-target line. To compute the no-fire aircraft headings, take the heading from friendly position to target and subtract 60 degrees to define the beginning of the no-fire zone then subtract an additional 60 degrees to define the end of the no-fire zone.

A6.3. Source Data. Assumptions, calculations, etc. for the MSD table can be requested via email: ***acc.a3tw@langley.af.smil.mil*** or phone: DSN 574-5896. POC is HQ ACC/A3TW.